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# FOURTEENTH ANNUAL REPORT

BY THE

## PROVINCIAL BOARD OF HEALTH

OF ONTARIO.

BEING FOR THE YEAR

1895.

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

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1896.



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**OF THE**  
**PROVINCIAL BOARD OF HEALTH.**

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C. W. Coveynton, M.D. .... Toronto.  
J. J. Cassidy, M.D. .... Toronto.  
H. E. Vaux, M.D. .... Brockville.  
E. E. Kitchen, M.D. .... St. George.

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MAY 25 1898

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FOURTEENTH ANNUAL REPORT

OF THE

PROVINCIAL BOARD OF HEALTH.

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*To the Honorable GEORGE AIREY KIRKPATRICK, K.C.M.G., Lieutenant-Governor  
of the Province of Ontario.*

MAY IT PLEASE YOUR HONOR :

The Provincial Board of Health begs leave to present its fourteenth annual report, and takes pleasure in acquainting your Honor that upon the whole the sanitary state of Ontario has been satisfactory, the Board not having to report the prevalence, to an extended degree, of any epidemic. Those diseases commonly existing in most communities of men have appeared here and there; but the people having acquired sanitary knowledge and consequent wisdom, have, under the guidance of their local authorities, in most instances, succeeded in putting a stop to the progress of such infectious maladies as have appeared among them. Chief among those diseases has been typhoid fever—chief in prevalence but not in fatality.

It seems becoming that the Board should express to your Honor its satisfaction with the readiness of the local authorities throughout the country to employ their powers in stopping the advance of contagious disease whenever it appears in the midst of their communities, and of the success which in all instances have followed their efforts this year, and that the year has been on the whole one so favorably marked by the healthfulness of its character.

Among the subjects which have occupied the attention of the Board may be mentioned :

- (1) The report of the committee on epidemics *re* Homes for consumptives;
- (2) a report of a committee of the Board on an outbreak of typhoid fever in Brantford;
- (3) a report of the committee of the Board on Water Supplies, *re* the water supply of Port Hope;
- (4) a report of the same committee on the investi-

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gation of the Thames river as a source of water supply for the city of Chatham ; (5) a report on the water supply for the town of Orangeville ; (6) a report on the Galt sewerage system.

With respect to "Homes for Consumptives" it has to be said that, while this Board is favorable to them, some prominent physicians are not as yet prepared to fully endorse their necessity, on the ground that consumption being a malady of which the causation is now clearly understood and easily obviated, there is no good reason for removing the subjects of it from their own homes, where by easy management it is quite possible to destroy the agent of its infection, and thus preserve the other uninfected members of the family from the disease ; this preservation being, according to them, the principal object in the removal of the consumptive from the private home. It need hardly be repeated however, that while the removal of the danger of infection to the healthy would be good reason for such Homes, there is, in the opinion of this Board and most sanitarians, the still greater reason that until consumptives be placed where their exercise, food and habits can be regulated, no great curative effects of climate are to be expected.

The enquiry into the outbreak of typhoid fever in Brantford resulted in the disclosure of its cause, and in its being shown that it is unsafe in that city to use any water from wells dug within its old limits, and that the public supply must be alone trusted for domestic use.

The yearly introduction of new public water supplies into the towns and villages of the Province is becoming noteworthy, and the duty of the Board to examine into the sources of supply has added much to its otherwise onerous duties. Especially is this true where, as in some instances it has occurred, the municipal authorities are inclined to challenge the wisdom of the Board's suggestions or the force of its arguments in preserving supplies from the danger of sewage pollution. There have been during 1895 several instances, however, where the Board's advice has already borne practical fruit, and where local public opinion has justified the action taken by this Board.

The purification of the water of the Thames river at Chatham, and still more, the more perfect plant of the same character for purifying the public supply of St. Thomas, are two very satisfactory examples of the successful results of artificial filtration ; the water from the not very clear river, passed through the artificial filter beds being proved by analysis to be equal in purity to that of waters of the first class.

The water supply of Orangeville, obtained from springs rising from beneath gravel beds in the vicinity of the town, is of the highest purity and sufficient in quantity, and illustrates another of the several ways by which Nature's *methods* are utilized by the modern sanitary engineer.

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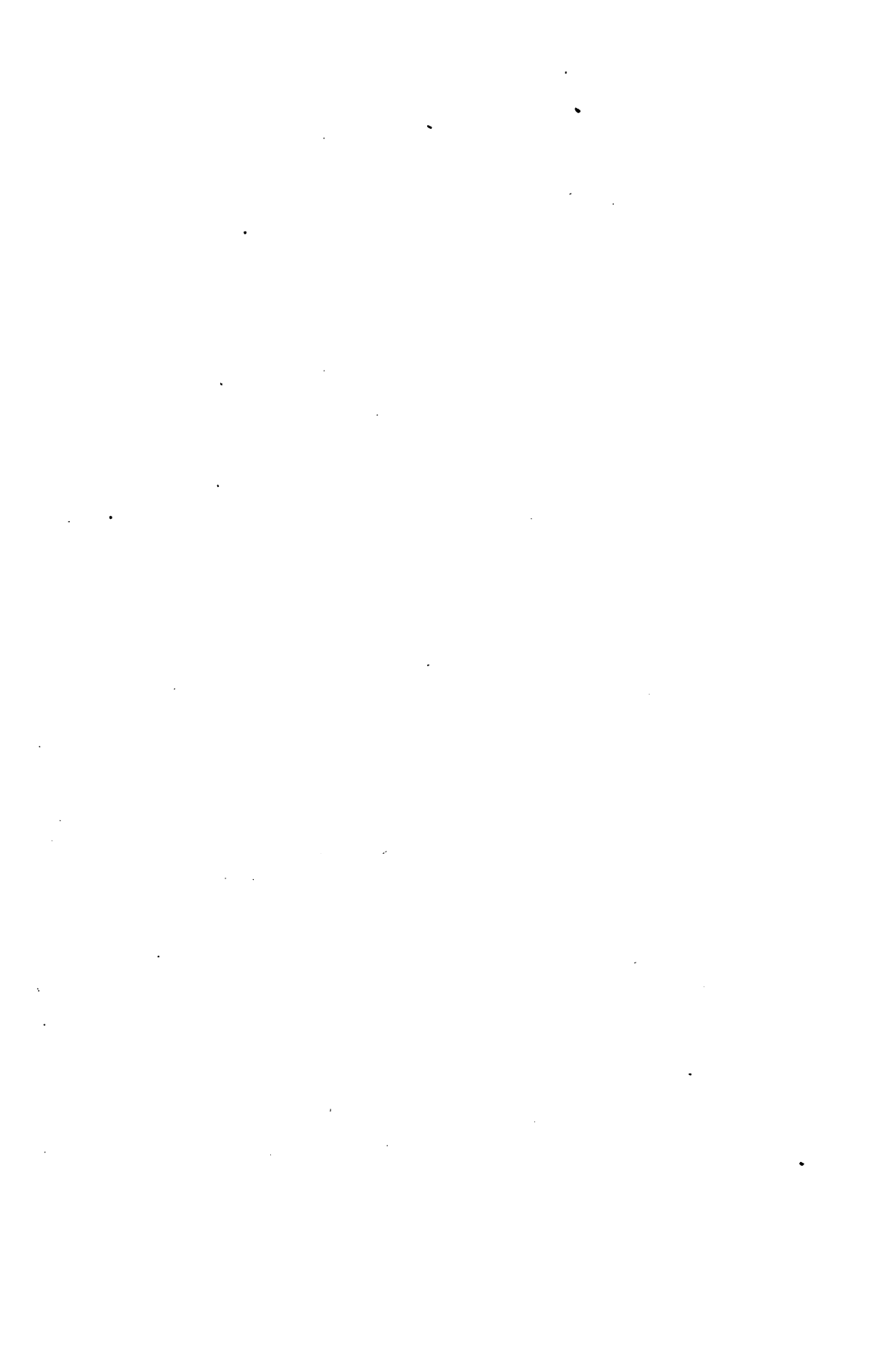
The Galt sewerage system has been a difficult problem for some time, the dwellers farther down the Grand river objecting to its pollution by the outflow from the town of Galt; while the latter were not prepared, on the ground of expense, to treat its sewage chemically or otherwise before its flow into the stream. The town is now consenting, after an appeal to this Board, by those who thought themselves aggrieved, to so treat its sewage as that it will flow into the river harmlessly. These have been amongst the special objects of the attention of the Board during the year, there having been only one or two appeals to it from localities afflicted by diseases other than have been mentioned. In one of these localities diphtheria had been allowed to run its course unchecked for some time, but the people at last awaking to the danger and taking needful precaution the disease was stopped in its course, but not until it resulted in severe losses in a few families.

Upon the whole the Provincial Board of Health is happy in being able to congratulate your Honor on the comparative freedom from sickness, and the suffering connected with it, which has been enjoyed by Ontario during the year which has passed.

All which is respectfully submitted.

J. D. MACDONALD,  
Chairman.

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# PART I.

## CHAPTER I.

### REPORT OF THE SECRETARY.

To chronicle the fact that the public health of Ontario has stood high, relatively, to other years and other countries during 1895, is but saying what has come to appear a commonplace, so frequently for several years past has it been repeated in so far as the general prevalence of and death rate from diseases taken cognizance of by the Public Health Act are concerned.

The beginning of 1895 saw several outbreaks of smallpox, which proved, fortunately, to be of limited extent and duration, like the twenty outbreaks from imported cases during the second half of 1894. With the improved situation in the administration of public health in Detroit early in 1895, the Province has been saved from any further cases coming directly from that source; although the fact cannot be overlooked that the disease has maintained itself in that city for nearly two years, and that the report on the public health for Michigan ending with March, 1896, states this disease to be existing in seven localities in the State.

As will be found in the quarterly reports of the committee on epidemics for the year, the second semester indicated, so far as the reports received from local boards can be taken as an index, that diphtheria, which had been prevalent in the similar period of 1894, had notably decreased in its extent of area and localized prevalence.

Outbreaks of scarlatina, some of which became locally quite general, were reported, but in most instances the type proved to be mild. The same may be said of measles, which is but indifferently reported; but its general prevalence in certain localities has been more than for several years past.

The prevalence of fevers of the enteric type in several districts, and in those towns and villages where no safe public water supply exists, marked the several months succeeding the phenomenal drought, which prevailed over nearly the whole Province during the first two months of the summer of 1895.

In a special report on typhoid fever in Brantford, found in Part II., some of the principal facts associated with typhoid prevalence will be found. Whatever theoretical considerations may suggest with regard to the causation of typhoid in relation to the several principal sources of local filth, the fact of its dissemination being due directly to drinking water, or indirectly through milk, stands out prominently in every study which has been made in recent years, whether in America or in Europe. The difficulties with regard to the condemnation of any water, such as that of a typhoid well, through the discovery of specific germs of disease by bacteriological examination add an element of difficulty to the question; and health officers are often forced to act on the now well-determined lines governing sanitary inspections. Given the presence of recognized sources of possible pollution of any public water or of private domestic supply, and action for the prompt removal of the cause of pollution continues to prove



effective in abating outbreaks of the disease. Thus it can be confidently predicted in cases such as that where the epidemic in Brantford was traced directly to polluted wells, that to the degree that such are closed, and the unpolluted city water utilized, will there be a decrease of fever cases, under conditions such as those which prevailed last season. It would seem that in connection with the specific germ of enteric fever, the element of external environment has supplied factors as yet unexplained and which leave the question of specific causation to some extent an open one. Associated with the existing uncertainty in regard to the specific germ of typhoid is, however, a growing assurance as to the possibility and practicability of restrictive measures for preventing these pollutions of waters, invariably associated with the prevalence of enteric fevers. The Provincial Board of Health may very well be pleased with the situation it finds itself in to-day, as compared with even five years ago, in the powers given it for the control of public water supplies, and the enforcing of measures to maintain them in a state of purity. The previous unsatisfactory condition of the statute, giving the Provincial Board power to deal with defective water supplies, or to insure the institution of new supplies of known purity, has been removed by the amendment made by the Legislature to the Health Act by the Public Health Act of 1895.\*

\* 3. Section 30 of the said Act (Cap. 205, R. S. O., 1887) is hereby repealed, and the following section and sub-sections substituted therefor:

30.—(1) Wherever the establishment of a public water supply is contemplated by the council of any city, town or village, it shall be the duty of the said municipal council to submit to the Provincial Board of Health, together with the plans, an analysis of the water from the proposed source or sources of supply, and an affidavit stating that the water analyzed is taken from the proposed source, and that the analysis submitted to the Board exactly represents the conditions of the sample examined. In case the source of any proposed public water supply does not in the opinion of the Provincial Board of Health, meet the sanitary requirements of the municipality, either by reason of the quality of the water, or because the water is likely, owing to the situation of the proposed source of supply, to become contaminated, it shall not be lawful to establish such waterworks without first obtaining from the Provincial Board of Health a certificate signed by the chairman and secretary, stating that the proposed source is the best practicable, having regard to all the circumstances of the case, and that all proper measures have been taken to maintain the supply in the highest possible and practicable state of purity.

(2) Whenever the construction of a common sewer or of a system of public sewerage is contemplated by the council of any city, town or village, it shall be the duty of the said council to place itself in communication with the Provincial Board of Health, and to submit to the Board, before their adoption, all plans in connection with said sewer or sewerage system. It shall be the duty of the Provincial Board of Health to enquire and report upon said sewer or system of sewerage, as to whether such is calculated to meet the sanitary requirements of the inhabitants of the said municipality, and as to whether such sewer or system of sewerage is likely to prove prejudicial to the health of the inhabitants of the said municipality or of any other municipality liable to be affected thereby.

(3) The Provincial Board of Health may make any suggestions or amendments concerning the plans submitted, or may impose any conditions with regard to the construction of such sewer or system of sewerage, or the disposal of sewerage therefrom, as it may deem necessary or advisable in the public interests; and the construction of any common sewer or system of sewerage shall not be proceeded with without being reported upon and approved of by said Provincial Board of Health, and no change in the construction thereof, or in the disposal of sewerage therefrom, liable to injuriously affect the public health shall be made without previous submission to and approval of said Board.

(4) The decision or report of the Provincial Board of Health with regard to any system of water supply or any common sewer or public system of sewerage, or the disposal of sewage therefrom, shall be subject to appeal to the Lieutenant-Governor in Council, such appeal to be made within one month after the filing of the report or decision in the office of the minister of the department to which the Provincial Board of Health is attached; and such decision or report, when not so appealed against, or when confirmed or amended and confirmed upon appeal by the Lieutenant-Governor in Council, shall be binding and conclusive upon all the municipalities and persons affected by the same; provided always that whenever it shall appear that any change of circumstances or conditions has arisen the Provincial Board of Health may, if it deem it advisable, make further enquiry and report as to any system of water supply or common sewer or system of sewerage, or the disposal of sewage, which report shall be subject to appeal as aforesaid, and have the same force and effect as aforesaid.

(5) The said Board may from time to time modify or alter the terms and conditions as to the disposal of sewage imposed by any award authorizing any system of sewerage or the extension of a sewer, and their report or decision shall be subject to appeal as aforesaid and have the same force and effect as aforesaid. But this shall not entitle the Board to modify or alter the terms and conditions of a certain award dated the 5th day of March, 1895, made by Judge Ketchum, in the matter of reference between the corporation of the town of Peterborough and the corporation of the township of North Monaghan, until after the expiration of the five years therein mentioned, but this provision as to the said award is only to apply in case the award is held by the courts to be in point of law a valid award.



Action under these new powers has already in several instances resulted most beneficially ; and it is to be noted with satisfaction that towns are becoming not only most anxious to maintain their own supplies in a state of purity, but are also accepting the position that they must so deal with their own sewage as not to make it a source of danger to other communities. In fact the recognition of the rights of suburban municipalities is being forced upon our towns and cities by the growing knowledge and appreciation of possible dangers on the part of even rural communities. As yet, doubtless, the fear conjured up is oftentimes more imaginary than real ; but if the fear of the rural dweller of pollution from external sources serves to make him apprehensive of the dangers near at home, we may well be pleased to know that the science of cleanliness is making headway on the farm as well as in urban municipalities.

The occurrences of the past year in connection with the pollution of international streams have still further brought into prominence the question of the disposal of town and city wastes, and have forced the necessity for conjoint action on the attention of your Board, which, through its secretary, presented the matter before the American Public Health Association at its Denver meeting last year. A special committee on the subject was appointed with your secretary as chairman, and it is hoped that the matter may soon be brought within the range of practical action.

As illustrative both of existing dangers and the certainty that they will become greater, there could not be a better example than that given in the report of the committee on epidemics, found in Part II. on the epidemic of typhoid in Windsor. The presence of the large city of Detroit on the American side of the Detroit river made it natural that the early settlements on this ancient highway to the Upper Lakes should develop from hamlets into towns ; and so there are, on the Canadian side, within a distance of four miles three distinct and separate urban municipalities with separate governments and imaginary separate interests.

Walkerville, at the head of the river, has the accidental advantage of having no town above it, and so can have pure water and be oblivious to the dangers which may arise from its sewage poured into the river within a mile of the intake of the public water supply, common to the two lower towns of Windsor and Sandwich. In such instances there can be but one conclusion as to the demand for intelligent co-operation between the several municipalities, and of the wisdom which the Legislature has shown in providing means for compelling such action if the public interests demand it.

A similar situation exists on the American side of the Niagara river, where Buffalo holds the key to the situation on Lake Erie, and oblivious to others' needs, pours the sewage of 350,000 people, and the refuse from the immense fleet of vessels in its harbor directly into the stream, which flows within three hours to the intake pipes of the water supplies of at least four other municipalities. Indeed the phenomenal industrial development of the district from Lake Erie to the great water power at Niagara Falls is making of the whole district what may be considered an almost continuous city. Curiously enough, the health authorities of Buffalo have been examining with interest and some alarm the water of the Grand River, Canada, which flows into the lake but a short distance west of Buffalo, for evidences of sewage contamination. With a danger most remote, if existent at all, the fact illustrates how the scripture adage of "seeing the mote in a brother's eye" while allowing the beam to remain in one's own, is applicable to communities as well as to individuals.



The large amount of correspondence during the year from the frontier municipalities of Muskoka, Algoma, and Nipissing, especially with regard to outbreaks of diphtheria, continues to illustrate the many difficulties incident to sparse settlement and most limited medical assistance and financial municipal ability. The work done by the Provincial Board through the assistance of the police magistrates of the unorganized districts, while serving in many cases most useful purposes in limiting outbreaks, is necessarily very imperfect and unsatisfactory, operating at such a long distance from the seat of operations, and with officers in some instances one hundred miles apart. The fact that there are some 100 school sections in the unorganized districts illustrates the existence of numerous small settlements, while it indicates the presence of an organization already in existence, easily made use of by a slight amendment to the Public Health Act, which would be productive of most excellent practical results.

The amendment to section 99 of the Public Health Act, prohibiting the feeding of offal in a raw state to hogs, has proved one step in advance in the difficult task of bringing the numerous slaughterhouses in every district within the control of sanitary regulations. There is, as has been repeated before, no such common cause of local nuisance, and, probably no more frequent cause for the spread of disease than the presence of such filthy establishments and the putrefaction of food materials which are prepared therein. The essential evil lies in the inability of local boards of health, as too often constructed in these village communities, to comprehend the effects of the evil or to suggest adequate local means for its remedy. Often influential residents, the slaughterers too often, have premises centrally situated with wretched buildings badly equipped for the purpose, and with poor water supply and no facilities for washing the floor or for the disposal of the waste except by throwing it on the ground.

The numerous reports from widely separated districts of contagious disease in animals intended for human food, and the positive fear which here and there has been created by irresponsible persons selling, locally, diseased animals is creating a state of affairs, not only demanding a remedy, but forcing the attention of the public to the only method whereby an adequate and permanent remedy can be applied. This must be found in the inspection by all incorporated municipalities of their public meat and milk supplies. This subject will be found treated of further in chapter IV. of this report.

The past year has witnessed gratifying progress in the propaganda, which the Board has for the last five years instituted in the education of the public and of the authorities in the national importance of the question of instituting systematic efforts to deal with tuberculosis, whether in man or animals; and to this end the establishment of "Homes for Consumptives" has been persistently recommended. Through the efforts which several philanthropic gentlemen have made, seconded by provincial medical practitioners, a site for a Consumptive Sanatorium has been selected near Gravenhurst in Muskoka, and a strong association organized to put it into practical operation. The town has granted a bonus to the scheme, conditionally upon its being conducted under regulations satisfactory to the Provincial Board of Health, and it is hoped that the Sanatorium, when once opened, will be conducted along such lines as will make it possible for your Board to extend its usefulness by bringing it into touch with the local boards and hospital boards in all the larger municipal centres of the Province.

This brief summary of the work of the year sufficiently indicates the scope of the problem and the extent of the tasks which your Board has had laid upon it.

*It might have been natural to assume that the Board, during the fourteen years of its existence, would have been able to so grapple with the foregoing and*

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other similar problems that comparatively little more than the continuance of routine work would henceforth be necessary. But experience goes to show that a very large proportion of the work of past years has been but the muster of prospective warriors and the organization of battalions and their education in arms. The *casus belli* is now well-defined and clearly set forth. We see the righteousness of the cause, while the people's enemies are definitely recognized. Improved weapons are daily being forged; and the marshalling of men for the attack is being carried on under the most modern methods of scientific warfare against disease. One need and this of the greatest importance must yet be supplied. The army chest, if not lacking is still most inadequately supplied. The department of the commissariat has in many instances been quite forgotten or in most instances hardly been organized. In Ontario, and equally so in most parts of America, the army in the field is loyal and enthusiastic to a phenomenal degree; but it is being starved. How long the blood will continue to flow warm in the veins of soldiers who, to use the words of another, are expected "to grow fat on the east wind," is a problem which may readily be determined by the physiologist; but it would seem that the municipal legislator too often deems himself the only trained manipulator of the haematometer. Of the experience of this Province as to what it has gained of health, of happiness and of freedom from epidemic disease during the past fifteen years, even the most skeptical cannot fail to speak; while to those who care to examine the collated statistics, whether of diseases or of deaths, an economic lesson will be taught of the most important kind as regards the increase of wealth through the avoidance of personal sickness and the loss of the results of productive labor.

With, however, the increasing recognition of the public health department as a necessary part of state or municipal medicine, with the objects for which it is organized more clearly defined, with its officers specially selected and trained to the service, it may perhaps be legitimately expected that a corps of officers of health spread over the whole Province will gradually make their services and their influence so felt that the money grants for carrying on good work and for fair remuneration to the workers will be voted, if not with alacrity at any rate with a consciousness that ample return will be made for the outlay.

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## CHAPTER II.

### THE ACTION OF LIGHT UPON BACTERIA.\*

It is a curious fact that in the history of every department of science we have examples of observers overlooking some simple near at hand point, the discovery of which at a later date explains many apparent discrepancies, necessitates new interpretations and perhaps alters profoundly subsequent work.

One example of this we see in the action of light upon bacteria and other organisms, the tremendous significance of which has been but recently recognized. Although the hygienic importance of sunlight was early insisted on, as a result of the study of epidemic diseases, when the bacteria were discovered, the comparatively logical investigation, viz., the action of light upon these organisms was to a very large extent neglected.

This line of investigation was not, however entirely neglected, a few isolated observers followed it up to a certain extent, but whether it was that they did not present their results in the proper manner, or that their work was overlooked on account of more startling and more interesting discoveries, the fact remains that with the publication of papers upon the subject in 1892 by Buchner, of Munich, and Marshall Ward, of London, the matter came almost as a surprise to bacteriologists. The result is that now that we do recognize this light action, we must look with caution on a good deal of earlier work, especially upon the virulence or viability of many disease germs. One evidence of the changed views upon the subject is seen in the way in which pure cultures are preserved in laboratories now, as compared with a few years ago. At present if a culture is required to be preserved in as normal a state as possible it is placed in a dark ice chest; formerly they were left exposed to the bright light of a laboratory.

Looking back at the history of the subject we find that the first paper upon the effects of light upon bacteria was one published in 1877 by Downes and Blunt in the proceedings of the Royal Society. They showed that diffused daylight had a retarding influence upon the putrefaction of organic infusions and that direct sunlight, absolutely inhibited putrefaction. These observers of course worked before the days of pure cultures, with mixtures of many species of bacteria in animal and vegetable infusions, and it was natural that their results should not have been so sharply defined as those of later workers with newer methods. Their work, however, formed the starting point of all the later researches. Isolated investigations were made in ensuing years, some of them of very great merit, but as I remarked above they did not seem to carry weight, and not until 1892 was the attention of bacteriologists generally turned to the subject.

This was due to the publication almost simultaneously, by Buchner, of Munich, and Marshall Ward, of London, of a series of researches, in which practically the same methods were adopted. The latter's attention was called to the subject by noticing that in plate cultures of bacteria, with which he was working, some of the colonies seemed to develop weakly and the suspicion pointed to the action of light in retarding the growth. To test this he infected plates of jelly with anthrax bacilli and their spores, and exposed them to direct sunlight or to diffuse light under screens of black paper in which were cut stencilled letters or

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\*Being substance of a paper read before the Canadian Institute by J. J. Mackenzie, B.A., of the *Provincial Board of Health*.



figures. In this way the light only fell on the infected jelly underneath the stencils. After exposure for a varying period, the plate was placed in a temperature favorable for growth, and at the end of forty-eight hours the jelly was seen to be cloudy with multitudes of colonies everywhere except where the light had acted, there the jelly was sterile. The plate when fully grown resembled in fact a photographic positive which had been exposed under a negative. Indeed one ingenious person in some experiments of this kind substituted a photographic negative for the stencilled paper with the result of a positive of the picture in bacterial colonies, the shadow being clearly jelly, the high lights cloudy with closely grown colonies.

Buchner's observations and methods were practically the same as the above with the exception that instead of *Bacillus anthracis*, he used the typhoid bacillus, and one or two other forms.

These experiments were, of course, open to the objection that although the sunlight undoubtedly stopped growth, it did not actually kill the cells. This objection was at once answered by cutting out small fragments of the isolated jelly and mixing it with fresh jelly and beef broth, the result being not the slightest evidence of growth, showing that the cells were actually killed.

These simple experiments have been amply confirmed by subsequent observers and the additional fact has been noted that bacteria are not all equally sensitive to light.

As the result of a number of experiments made by different observers in Europe, one may conclude that in plate cultures an hour and a half's exposure to direct sunlight will kill most bacteria, that five hour's exposure to diffuse light will have the same effect and that twelve hour's exposure to an electric light of 900 candle power will have an equal result. In the action of sunlight, the state of the atmosphere plays a very important part, the slightest haziness retarding the action materially. This is shown very markedly by a comparison of Marshall Ward's results with those obtained in Germany, the smoky atmosphere of London rendering a longer exposure necessary in order to destroy the germs. The time of the year is also important, but Dieudonne of Berlin found, curiously enough, that strong March sunlight was as germicidal as that of July or August.

Long before the actual death of the cells, however, the light has begun to have an effect upon their metabolism. If cultures were taken of such a form as *Bacillus prodigiosus*, a germ which causes a liquefaction of gelatine, and produces a blood red color; half an hour's exposure of such a plate to direct sunlight, produces colonies with a distinct loss of power to liquify the jelly and with a total loss of color production.

The isolated bacteria had to be cultivated in fresh jelly for some little time before they regained their normal character. This shows very distinctly that the light is injurious not only to the bacteria actually exposed, but that the injurious effect is transmitted to their descendants for a number of generations. The possibility of this is no doubt due to the asexual character of the reproduction in these organisms, as naturally a bacterial cell would have to divide (*i.e.*, reproduce) many times before it finally got rid of the injurious metabolic products of light action.

Not only in culture media in the laboratory, has light been found to have a germicidal action, but also in water the same effect has been noticed. Buchner found that a sample of water containing 1,000,000 germs of *B. coli* per c.c. was sterile after one hour's exposure to direct sunlight. He further found that the solar action penetrated for some depth into clear water, for instance, exposure to

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sunlight of one of the plate cultures described above for four and a half hours, at a depth of about eight feet, caused the death of the bacteria. Beyond that depth, however, the action became rapidly weaker.

Even in the air when the bacteria or their spores are quite dry, the sunlight has a very considerable germicidal action; this fact has been beautifully shown by some experiments of Marshall Ward's made in order to determine whether the change was in the bacterial cell or in the culture medium. Anthrax spores were allowed to dry upon the bottom of a plate glass plate and then were exposed under stencilled black paper, as in the other experiments, after exposure for a long time they were covered with a thin plate of sterile agar jelly, with the result that the spores that had been insulated did not grow, whilst those which had been protected from the light infected the jelly and grew; while the reverse experiments in which the spores were preserved in the dark, whilst the jelly plate was exposed, showed that the sunlight had no appreciable effect upon the jelly, the bacteria growing well in all parts of it. This experiment proves very conclusively the change, whatever it may be, takes place in the bacterial cell, not in the medium in which the bacteria are living.

In all these cases, however, it was found that a necessary condition of light action upon bacteria, was the presence of oxygen.

Anthrax spores in water are rapidly killed, but if the air over the water is exhausted, or replaced by hydrogen, they are not killed. This has been confirmed by many different observers: a *sine qua non* for the germicidal action of light seems to be the presence of oxygen.

All these researches, of course, were at once open to the objection that the destructive action was due, not to the light but to the heat, and these objections have been answered by different men in different ways, such as by the use of the control plates with thermometers or by the absorption of heat rays by alum solution, etc., etc., but always with the same result, the heat had nothing to do with it.

After settling this point, the question naturally arose, what particular rays of light were germicidal and what were not?

This question was answered by many observers by using color screens to interpose between the light and the bacteria. It was shown that screens which absorbed the blue, violet and ultra-violet rays of the spectrum had the same effect as black paper, no germicidal influence passed through. On the other hand, screens which transmitted these rays did not retard the death of the cells; under such screens, especially if quartz was substituted for glass, death took place as rapidly as in direct sunlight.

Perhaps the most beautiful demonstration of this fact is given by Marshall Ward in one of his communications to the Royal Society. A plate infected with anthrax spores was exposed to the spectrum of the sun or of a powerful arc light. Broadly speaking, the effect of the light became visible first at the green end of the blue and increased in amount until, in the blue violet and violet, it reached its maximum intensity, but it extended quite far out beyond the limits of the visible spectrum, showing the action of the ultra-violet rays.

From all these researches it will be seen that the sunlight is, perhaps, one of the most important hygienic agencies in the destruction of bacterial life. In the self-purification of streams, perhaps we find it assisting most materially. A series of investigation made under Buchner, would tend to show that there is even a diurnal variation in the bacterial contents of rivers and lakes, the daylight gradually killing off the bacteria, so that they become less numerous as the



day passes, but as soon as night sets in they begin again to increase, reaching a maximum a short time before day breaks. The following are some observations upon the River Isar:

6.15 P.M.	.....	160 per c.c.
8.45 "	.....	5 "
11 "	.....	8 "
12 "	.....	107 "
1.45 A.M.	.....	380 "
3.00 "	.....	460 "
4.00 "	.....	520 "
5.00 "	.....	510 "
6.15 "	.....	250 "

This is, however, only an isolated example, and the subject would require much more extensive working over before one could accept as startling a variation in numbers as between 520 and 5 as due to sunlight alone. It must be admitted, however, that bright sunlight on a summer day must mean an enormous destruction of bacterial life in a lake or river.

The action of sunlight, doubtless, also explains why surface waters constantly have more bacteria in them in winter than in summer, although the conditions of temperature are so much less favorable to bacterial growth.

Aside from the actual destruction, we see in cultures from streams in the summer, qualitative differences as compared with cultures from the same streams in winter, and this qualitative difference is undoubtedly due in part to the action of light injuring the germs to such an extent that they do not grow characteristically in the gelatine plates.

Another very important condition must play a part in the destruction of bacterial life by sunlight. This is the power of independent motion which many have, and their need for oxygen. The oxygen diffuses downwards into the water with comparative slowness, and motile bacteria which are aerobic (*i. e.* require oxygen for growth), will move upwards to the region of most favorable oxygen tension in the water. This necessarily exposes a greater number to the action of the light than would occur if they were evenly distributed, or if they tended to drop to the bottom as the non-motile forms do. It must not be forgotten, however, that there is a very great difference between the intensity of action of direct sunlight and diffuse light, and consequently the comparative clearness of the water plays a very important part in determining the life of germs suspended in it. While light will have an actual germicidal effect upon bacteria three or four feet down in clear water, in muddy water its effect is comparatively superficial.

But in the air about us, the germicidal effects of sunlight are seen and undoubtedly play a part in the limiting of infectious diseases which recently would hardly be believed possible. The bacillus of tuberculosis when exposed to sunlight in the dry state is killed as quickly as any other forms, and even before it is killed its power to harm, *i. e.*, its virulence is very materially decreased; the same is true for the bacteria of diphtheria, cholera, typhoid and all the other pathogenic bacteria. In regard to tuberculosis, I have no doubt that the action of light in destroying and weakening the germs, has perhaps as much to do in explaining why more of us do not contract the disease as any other factor. For when we think of the number of cases in such a city as Toronto, in which absolutely no care is taken about the disinfection of the sputum, and remember that a large

percentage of this sputum, laden with millions of the germs of the disease, finds lodgement upon our pavements to be converted into dust, we can easily realize the chances of infection if there was not present some such natural agency as sunlight to weaken or destroy the germ. It must be remembered here again, however, that in air, the light has not a free scope to carry on its destructive work, that every germ which is covered with an envelope of dirt, is protected by a light screen, that in a layer of mud or filth, such as lodges on our cedar block pavements, the light acts in a purely superficial manner, and that dark and narrow alleys such as are found in the cities of the old world protect myriads of bacteria from destruction by light.

It is a curious biological point that one can recognize a plate culture from air, at once, by the characters of the bacteria which are found in it. What might be called a typical air plate will show the presence of germs which grow very slowly and have a very slight power of liquefying the gelatine, but especially it will show the presence of a large number of forms which are so-called chromogenic forms, mostly yellow, orange and pink, all colors which naturally protect the protoplasm of the cell from the effects of the actinic rays.

Accepting then the action of sunlight upon bacterial life, the question arises how does it act; is it due to the formation of some substance in the medium in which the germ lives, which is germicidal, or is it due to an action within the germ itself?

A number of experiments tend at first sight to show that the first view is the correct one, these are as follows:—Some observers have found that some media are distinctly less favorable for the nutrition of bacteria after being exposed to sunlight than before. This is certainly true, but death from insolation may occur in media in which it has been impossible to show such a change, whilst direct experiment shows that air dried spores are destroyed by sunlight. Marshall Ward's observations on anthrax spores are especially interesting here: as I explained above, exposure of the dried spores under the stencilled paper showed destruction in the lighted area, whilst insolation of the medium with protection of the spores showed no destruction. But numerous observers have shown that sunlight acting upon moist substances of all kinds, gives rise to peroxide of hydrogen. This has been shown for practically all the culture media used in the experiments. Peroxide of hydrogen is an active germicide, and if a sufficient quantity were present, would explain sufficiently the germicidal action of the light. This, unfortunately, would not explain the action in the case of the dried spores, unless we accept the formation of this substance in the interior of the spores. At the same time, it is not found in culture media in sufficiently large quantities to account for the exceedingly rapid death due to direct sunlight, such, for instance, as the destruction of the typhoid bacillus in an hour and a half. It has been shown that a solution of peroxide of hydrogen of a strength of 1 to 20,000 only prevents the development of bacilli but does not kill them, and in order to kill many of the bacteria of the mouth, Miller found that a ten per cent. solution was necessary, acting for from ten to fifteen minutes.

It seems to me more probable that although the formation of peroxide of hydrogen must have an injurious effect, it is really only one of the accompanying phenomena of the germicidal light action. There are, apparently, no other substances formed in culture media by insolation which will explain the germicidal action, so that we are compelled to look to the action of light upon the cells themselves.



The destruction of dried spores by direct sunlight is very good evidence that the injurious substances are in the cells, but there are other reasons. The fact which I referred to above, is perhaps one of the best, viz., if the light is of a low intensity, or acts only for a short time in forms such as *Bacillus prodigiosus*, its effect is seen long after the germs are removed from the action of the medium in which insolation occurred. The cell is constitutionally affected so that for many generations its descendants cannot produce the necessary ferments which enable them to liquify the gelatine nor produce the color which is so characteristic of the germ.

Marshall Ward has brought this out very clearly in a recent communication of his to the Royal Society in some biological studies upon *Bacillus ramosus*, a common water germ, a culture of which is shown in this plate. These researches have a very great biological interest apart from the subject of light action. In fact the whole paper is one of the most valuable which has been contributed upon the biology of bacteria.

Throughout the researches which were exceedingly long and tedious, the observations were made upon the growing cells under the high powers of the microscope, not in mass culture such as are our ordinary methods of investigation. The organism was followed from the germination of the spore, throughout its life, until spores were formed again and the effects of various conditions, favorable or unfavorable, noted by observing the rapidity of germination; and the rapidity or abundance with which spores were formed when nourishment was exhausted. The results of observations upon single individuals was of course to show the effects of slight unfavorable conditions which would be missed when the organism was studied in mass cultures.

Ward's conclusions were that the spore was even more sensitive to the light than the growing bacillus. That the growing bacillus seemed to possess something which enabled it to withstand the injurious light action for a certain length of time. It seemed also that the growing bacillus could more readily recover from the light action than the spore, as the spore when exposed for the same time to light, germinated slowly, produced slow-growing cells, and finally gave rise to a smaller crop of spores when growth ceased.

This showed that the injury was a constitutional one of great importance but that the growing bacillus started from a non-lighted spore, in some way, overcame the injurious effect. In fact, some observation showed that direct sunlight allowed to play upon the growing filament had at first a stimulating effect. At first, as a result of insolation, growth rose to an abnormal rate and then ceased altogether. Marshall Ward's theory then, is that the injurious effect of light is due to an action upon some substance in the cells of the organism, which is destroyed by a process of oxidation, and the greater sensitiveness of the spores is due to the large amount of food material stored up of a highly unstable character, ready for use as soon as germination begins. This, I think, is the right view, although we will have to work out many points before we can explain it all clearly. The necessity of the presence of oxygen, points to its being due to an oxidation change, and the observations upon the growing filaments which were first stimulated to excessive growth, and then killed, are especially interesting as bringing the whole question into line with what we know, with regard to higher plants, viz., that whenever we find rapid growth or tissue change going on, such as the opening of the flower, growth of the leaf, etc., we find that there is at the same time an increased absorption of oxygen, and excretion of carbon dioxide, and in many instances a distinct rise in temperature of the growing organ; all in fact pointing to increased oxidation, i. e., increased destructive metabolism.



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If we apply this to the bacteria, we see destructive metabolism in the spore means a storing up in it of poisonous metabolic products, which if not too numerous, simply clog it as it were, whilst if more numerous actually cause the death of the protoplasm. On the other hand in the growing filament, by the very fact that it is growing, it is enabled to get rid of these metabolic products or in some cases when the light is intense, the intense destructive metabolism reacts upon the cell in the production of an abnormally rapid growth, but the cell, however, rapidly becoming exhausted dies.

Extending the biological significance of light to other plants, Ward points out a fact which will occur to all of you who have any botanical knowledge as broadly correct, viz., that wherever we find a unicellular structure, which contains stored food material, and at the same time is apt to be exposed to light, we find that it is protected by a light screen.

For instance grains are almost always yellow or brown in color, the oily contents being thus protected by the colored coat from the actinic rays of the sun. Amongst agarics, those forms with colorless spores occur mostly in woods, whilst those like *Coprinus*, which have black spores grow right out in the open. Many of the moulds have olive green or black spores and so on. In fact it is possible that one of the important functions of chlorophyll, is to act as a light filter for the unstable compounds present in the plant cell since we have long known that it absorbs the whole violet end of the spectrum.

We see then from the facts which we have placed before you, that as far as concerns bacterial life, we have in the sun a very potent factor in its destruction, and it is not far to the conclusion that if we wish to rid ourselves of these forms of bacteria, which we have to fear, viz., the disease producing ones, one of the best methods is to allow all the sunlight possible to enter our homes and our streets. These conclusions most of us have reached before we knew anything about the action of light upon bacteria, but it is always well to have good scientific grounds for our belief. At the same time it is well to remember that there are even under the most favorable conditions, obstacles to the penetration of light everywhere, and that it should in the case of actually infected surroundings, be depended upon only as an accessory means of disinfection, and that there are other ways of destroying bacteria which are entirely under our control and consequently certain.

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### CHAPTER III.

#### A REVIEW OF THE ELEMENTS ENTERING INTO SOME CANADIAN CLIMATES IN RELATION TO TUBERCULOSIS.\*

Having taken advantage of the opportunity afforded by my attendance at the meeting of the American Public Health Association, held in Denver in October last, I extended my trip westward to San Francisco, and thence returned by way of Victoria and the Canadian Pacific Railway. Having already visited most of the so-called health resort districts of the continent, I was anxious to compare the high-level districts of our western mountains with these, and to collect such data as might seem likely to prove of value in arriving at some comparative estimate of our Canadian climates, with similar districts farther south, in relation to their influence on tuberculosis.

The subject of climate is too extensive to be exhaustively treated even in a series of reports, and where so much has been written one is naturally loath to express positive opinions with regard to the climate of localities he has visited; so I shall, therefore, limit my remarks to the consideration of some Canadian climates, referring to others only incidentally and for purposes of illustration.

Excluding the moist sea-board districts of Canada, we may conveniently divide our climate into that of three more or less distinct districts.

1st. That of Ontario and Quebec.

2nd. That of the great prairies extending in foothills sixty miles beyond Calgary to the very base of the Rocky mountains.

3rd. The Rocky mountain district of high-level climate, including under this term, that of the mountain ranges extending westward to the Cascades or Coast Range.

These again may be divided and sub-divided, for the purpose of study, in order to obtain as many as possible of the details which would characterize any particular climate which we might consider as having positively favorable influence upon the treatment of consumption.

1. *Ontario and Quebec climates.* These are all to be considered as low level climates, the greatest heights being those of the Central Plateau of Ontario; and next to these, the wooded districts of Muskoka and Algoma. Always excluding from our consideration the immediate shores of the great lakes, and notably those of the lower levels, as of lake Ontario, we find that the Central Plateau of Ontario varies from the Muskoka region in two particulars: (a) The denuded character of the surface, it practically having had its forests cleared away, and being thus more or less completely exposed to the winds blowing from the several great lakes bounding the western peninsula; and (b) In the surface characteristics of its soil, which overlies limestone rocks, and is generally of a clay loam and gravelly loam in character. In Muskoka, on the other hand, we have a district still very generally wooded, and having as its surface geology, a series of rocky ridges with intervening valleys, formed by the foldings of the gneissoid Laurentian rocks. The whole country, where not denuded by clearings and by forest fires, is covered with a dense forest of mixed woods, everywhere characterized by much evergreen growth, notably hemlock, balsam and spruce. The rock comes everywhere near the surface, much indeed being bare on the

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\* Being a report presented to the Provincial Board of Health, by P. H. Bryce, M.D., Secretary.

hillsides, while the valleys of the streams are generally overlaid with black deposits of humus. Everywhere in the valleys are lakes, rivers and creeks. Of necessity, the climate must naturally be considered one with much humidity, its average rainfall, sunshine, etc., being set forth in the accompanying diagrams. That it has hitherto proved a salubrious climate for the settlers there is shown both by twenty years of vital statistics and by the generally high reputation it has obtained as a summer health resort. That settlers almost wholly engaged in outdoor pursuits have always been notably free from consumption, the vice of city dwellers, is well known; and hence it does not follow of necessity that the Muskoka climate is, *per se*, specially suited to consumptives. It has, however, I believe, certain positive qualities which must place it in a high position in its class of low-level climates.

These are: its natural drainage, which is most admirable; its shallow and porous soil, drying quickly; its rocky surfaces, rapidly warming and tempering, along with the warm waters of its innumerable lakes, the cold air of evening; which latter desideratum is still further obtained by its extensive forests, constantly moderating the effects of radiation by the warmth of the air which surrounds them, since the sap slowly cools and the ground beneath them radiates its heat but slowly; while also the violence of the general movements of winds blowing over them from the cold surfaces of our great lakes of the north is effectually lessened by these forest areas.

These climates have comparatively low winter temperatures, winter beginning commonly in November, and continuing with frozen lakes and deep winter snow, thereby creating a dry winter atmosphere, largely free from much that makes, notably the southwestern portion of Ontario and the whole central states, so damp in the winter. The salubrious influence of dry winter cold, where protection from the winds is afforded, is well known.

2. *The climate of the prairies and foothills.* Passing westward from the forest region of Keewaydin, we soon recognize the positive character of the nine hundred miles of largely treeless prairies, extending to the base of the Rockies, with a level of from 400 to 5,000 feet above the sea. From examination of the weather chart we see that the whole region lies rather to the north of the track of the easterly movement of the great storm centres, which are constantly forming in the northern Pacific. Like all the prairie country of the west, the climate has, however, two distinguishing characteristics, viz., much sunshine with great heating of the earth's surface during the day, followed by extremely rapid radiation of the earth's heat at night, brought about by the absence of trees and lakes and of their accompanying humidity; and by the high winds, the necessary sequence of the unbroken surface of the country. As the Rockies are approached and the elevation increases, these characters present their extremes. During the day, intense insolation from the increasing height and increasing dryness is present; while during the warmer seasons we have as especially characteristic the daily high winds, caused by the cold air currents rushing down from the summits of the snow-capped mountains to take the place of the ascending currents of air, warmed over the rapidly heating surface of the dry plains. Intensity, extremes of climatic phenomena, in a word, variability, diurnal rather than seasonal, is the chief characteristic stamped upon the climate of this immense tract lying between the forty-ninth parallel and the wooded belt to the northward.

3. *The Rocky mountain, or high level climates.* As we approach the mountains we again come into a climate moist enough to supply a forest growth well up to the top of the mountains of the highest ranges. The mountain-tops are clothed, notably in the Selkirks, with eternal snows, while their streams



for the most part finding their outlets, southerly towards the western sea, flow through canyons and mountain passes, giving local character by their presence to the climate of the different valleys, always changing as they are in their levels and exposures to sun and wind. In these valleys are many spots sheltered against the prevailing winds, which closely follow the course of the deep canyons or river valleys. This immense sea of mountains, extending to the very coast line in British Columbia, has, then, an almost infinite number of "local climates," as may be readily understood when we find that between Vancouver on the sea and Kamloops up the valley of the Fraser, we can find two climates, one with an annual rainfall of thirty-five inches, and another only two-thirds the distance between Toronto and Montreal distant, with an annual rainfall of only eleven inches, and this at a height not more than 1,000 feet above sea level. Many equally great differences can doubtless be found at distances many miles nearer the coast.

We have thus inside the mountain wall of the Cascades, or coast range, a remarkable phenomenon, viz., narrow river valleys, and rising from them in benches, like terraces, hill after hill, absolutely dry and treeless, brown, except for a brief period in the spring, and without vegetation other than the bunch-grass, characteristic of the arid foothills to the east of the Rockies. Within less than an hour's ride by horseback, one may rise from 500 to 4,000 feet, and within a few moments go from the irrigated bottom lands, with their three and four crops of grass, to bare hills, which seemingly are wholly without vegetation.

It is needless to say that in such a region we have climatic conditions so totally different from anything seen in Ontario, that we must fail to adequately conceive the character of such a climate, or what would be its probable effect upon the progress of consumption. What is quite clear, however, is that within 200 miles of a sea climate, where it may rain during almost all the winter months, with but little positively cold weather, being influenced by the warm westerly winds caused by the Kuro-Sivo current, we have a climate at the altitude of Guelph which has almost perennial sunshine; where there is but ten inches of rainfall annually, where the soil, speaking generally, is dry to barrenness, where roses may bloom in November, and where the elevation being low, the mountains of the coast range, while robbing the air of its moisture, are yet not so high as to be covered for long periods with snow, as where the height is great, and the cold winds blow from the higher mountain peaks to the eastward.

I have in a broad manner set forth the distinctive characteristics of our three great inland areas of climate, and their several differences are at once seen. There are, however, included under these broad characters many minor ones, which are continually taken into account in the consideration of climates. Thus we have, not only wind, but the direction of the prevalent winds, as well as their average velocity. In temperatures we have not only annual maxima and minima and their mean, but the monthly mean and the daily mean or range. We have, further, the average cloudiness and the number of days of sunshine and of rain; and we have the monthly and annual relative humidity, or the percentage of moisture commonly present in the air.

It therefore becomes manifest that with the variations of the seasons from year to year, the climate, even for the same locality, is at the best based upon a system of averages and a delicate balancing of the several factors in order to arrive at definite conclusions as to what is best suited for certain physiological and pathological conditions. Thus we have cold as opposed to heat; humidity



as opposed to dryness; cloud as opposed to sunshine; high as opposed to low levels; variability as opposed to equability; plain as opposed to forest areas, and the many important elements of soil, drainage, etc.

After a careful survey of the several elements I am inclined to place the factors of climate in relation to the treatment of tuberculosis in the following order of importance:

1st. Dryness of soil and air.

2nd. Equability—including daily and also seasonal range.

3rd. Temperateness—or absence of extremes of daily or seasonal heat or cold.

These, it will be found, include or cover most, if not all the other factors, such as hours of sunshine, character of soil, annual rainfall, daily range, mean daily and annual temperatures, direction and velocity of the wind, extreme heat and extreme cold, and treeless or forest areas.

So far then as we are immediately concerned with these factors, we may shortly compare these three main types of Canadian climate by reference to such meteorological data as are available. In the tables and diagrams appended are given the data for the several areas, Toronto being taken for comparison. Those that are complete and comparable are the mean monthly temperatures, the mean daily range, the monthly rainfall in inches and the number of rainy days. It is unfortunate that the mean relative humidity is not available for the western districts, in order that the relation existing between the number of rainy days and the total rainfall might have been seen.

Although a few degrees of either greater or less cold or heat do not appear to be material in themselves, yet in relation to humidity and daily range they become of much importance.

Thus we see that Kamloops has a slightly higher temperature than any of the four stations.

Mean annual temperature:

Toronto.....	45° F	Lat. 43°-45°
Gravenhurst.....	41.8	" 45°
Calgary.....	36.9	" 51°
Kamloops.....	46.3	" 50°-45° although

nearly in latitude 51° north, while Toronto is 43°-45°.

The mean daily range, while in my opinion a very important factor in estimating the value of the climate, is not a factor to be estimated apart from the temperature and humidity. Thus the high daily range of Calgary throughout the year must be considered in connection with its 3,500 feet above sea-level, and with its intense sunshine during the day and its great dryness, there being but eleven inches of rain and ninety wet days in a year. Such dryness prevents saturation of the atmosphere and promotes diathermancy, thereby making rapid radiation of heat and fall of temperature a necessary sequence. Opposed to such conditions in every particular, we see Toronto with a daily range from thirty-three to fifty per cent. lower at 350 feet above sea-level, and a humidity so much more as to have annually 200 days of rain and a precipitation of thirty-four inches, which serves both to reduce temperature and lessen daily range through the saturation of the air at night-fall and the formation of dew. It is interesting at this point to note the position of Gravenhurst between these two extremes. With a daily range midway between the two, except in February, when it becomes excessive, it shows an annual mean temperature only 3.3° lower than Toronto; and while *having*, owing to its heavy snowfall, rather more of an annual rainfall, has less



than seventy-five per cent. of the number of rainy days seen in Toronto, with no more than 500 feet of greater elevation. We see in the latter comparison the marked influence of the great body of cold lake water on which Toronto is situated in promoting humidity, which, while lower in March than at Gravenhurst, increases to one-third more in April, and maintains this position until July, when the great lakes having become warm the autumnal precipitation in both districts moves along together. Associated with the chilling influence of our Great Lakes we find that, though nearly one and a half degrees farther south, the temperature of Toronto is but slightly higher from April to August than that of Gravenhurst, where the protective influence of the great forest areas and the rapid heating of rock surfaces cause the day temperature to rise rapidly, although not to such a degree as to cause an extreme daily range. We thus have in the region represented by Gravenhurst an approach in some degree to the standard we have proposed.

In the general description of the climate of the great inland areas, already given, I have pointed out the unusual combination of topographical features, which gives us in the district represented by Kamloops, in a latitude almost the same as that of Calgary, and at a height above sea-level but 700 feet higher than Toronto, a climate with dryness as great as that of Calgary, (there being but eleven inches of annual rainfall and but seventy-five days of rain, or but slightly more than one-third of the rainy days in Toronto), and with an annual mean temperature nearly one degree higher than that of Toronto and ten degrees higher than the annual mean of Calgary. The existence of such a climate in a latitude of 700 miles farther north than Denver (40° N.), having an annual rainfall one-third less and an annual mean temperature but three degrees lower than Denver, at an elevation not exceeding 1,000 feet, is so remarkable and interesting a fact as to demand our earnest attention. From the comparison already given we have seen in Toronto and Calgary illustrations of two types of climate the one without great extremes, and the other that of the dry, high-level climate, with whatever excellencies or defects attach to each. At Kamloops we have a climate partaking of some of the qualities of both, and yet being quite distinct from either. With an altitude, the same as many points within twenty miles of Toronto, it has a rainfall equal only to that of Calgary, of El Paso in Texas, or the city of Mexico. With a temperature but slightly colder in January and rising in March to that of Colorado Springs, its August mean temperature is just the same as Toronto, and is followed by an autumn extending to December with a distinctly higher mean temperature. This mean, as might naturally be expected, is obtained without the great daily range seen at high levels.

*Comparison of Mean Daily Range.*

—	August.	September.	October.	November.	December.
Colorado Springs, 6,050 feet .....	30.0°	28.0°	24.5°	23.2°	.....
Calgary, 3,500 feet .....	28.9	30.4	27.1	23.7	21.6
Kamloops, 1,100 feet .....	29.2	27.9	17.9	11.9	11.9

It would thus appear that at the moment when the temperature, declining with the advancing year, makes the element of daily range an important factor in climate we find the daily range in Kamloops dropping to seventeen degrees, and eleven degrees in the cold months, and this with a monthly rainfall not averaging half an inch during the last four months of the year. Similarly we find in March and onward, with a moderate daily range and great dryness, the temperature rising to a monthly mean some ten degrees above that of

Toronto. We need not here discuss the causes of these remarkable qualities; but it must be abundantly evident that they supply those conditions in a very large degree, which the advocates of equable moist climates without great variability demand on the one hand, and which those of dryness, diathermancy, variability and stimulation demand on the other. The climate of the basin east of the coast range does therefore supply in a notable degree the elements which, as already stated, seem to me the most important in the climatic treatment of consumption, viz., *dryness*, with brightness of insolation and those positive haematogenic effects now universally accredited to sunlight; and *equability* as illustrated by the several examples already given, due especially to the accident of its low elevation and to the warm winds robbed of their moisture, which blow over the coast range and which doubtless lessen what in so dry an atmosphere would ordinarily result in great radiation at night fall, with an increased daily range.

That the climate is in the true sense a *temperate* one, that it is in a remarkable degree free from extremes of heat and cold, has been sufficiently illustrated by comparison with Colorado; but the comparison is most readily understood when we state that the mean annual temperature is two degrees higher than the southern highlands of New York and Pennsylvania, five degrees higher than that of the Northern Adirondacks, where are some of the most noted sanatoria, two degrees colder than Newport, (R. I.), and only thirteen degrees colder than Los Angeles, whose monthly mean in January is not lower than fifty-two degrees. The latter climate, though having but little rain, had in 1894 forty-five cloudy days, 167 partly hidden, and has frequent fogs owing to the influence of the northerly cold currents along the coast. The highest temperature in 1894 was ninety-nine degrees.

From this comparative study it has been made apparent that we have within the limits of Canadian territory climates comparable in every way with those of the United States, excepting of course those southerly latitudes which, moderate in winter, are nevertheless wholly unsuitable as health resorts except during the winter season. We have too, as has been fully illustrated, three distinctly different types of climates, each of which has some qualities, which experience elsewhere has proved to be suitable to some particular person or persons and apparently unsuited to others.

It seems, therefore, that in the progress of the movement, which this Board has for years so persistently advocated, for the establishment of homes or sanatoria for the proper supervision and treatment of consumptives there can be no good reason to doubt, but that, if any such institutions be properly conducted, their location, whether in Muskoka, or Calgary, or Kamloops, will have as happy results from the standpoint of cures as any sanatoria situated in similar climates in other countries. How great have been their success, we have to-day extended statistics to prove. It is to be hoped that in every Province such action will be encouraged by such private benevolence and Governmental assistance as will lead to the establishment of sanatoria at several centres in Canada; so that we may from year to year be able to establish from comparative statistics the real value of the more important elements which go to make up the several types of climate.

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NOTE.—As seen in the following diagrams the *average mean annual* temperatures are as follows: Toronto, 45.1° F.; Gravenhurst, 41.8° F.; Calgary, 36.9° F.; and Kamloops, 46.3° F. The *mean daily ranges* of temperature are, Toronto, 15.9° F.; Gravenhurst, 21.3° F.; Calgary, 26.1° F.; and Kamloops, 22.8° F. The annual rainfalls in inches are, Toronto, 34.04 inches; Gravenhurst, 36.77 inches; Calgary, 11.54 inches; and Kamloops, 11.06 inches.

The total days of rain during the year are, Toronto, 200 days; Gravenhurst, 143 days; Calgary, 90 days; and Kamloops, 75 days.





Diagrams showing, Fig. I., Mean Annual Temperature ; Fig. II., Mean Daily Range of Temperature ; Fig. III., Annual Rainfall by Months in Inches, and Fig. IV., Annual number of Rainy Days by Months at the four Weather Stations of Toronto, Gravenhurst, Calgary and Kamloops, Canada.

Fig. I. Mean Annual Temperature.

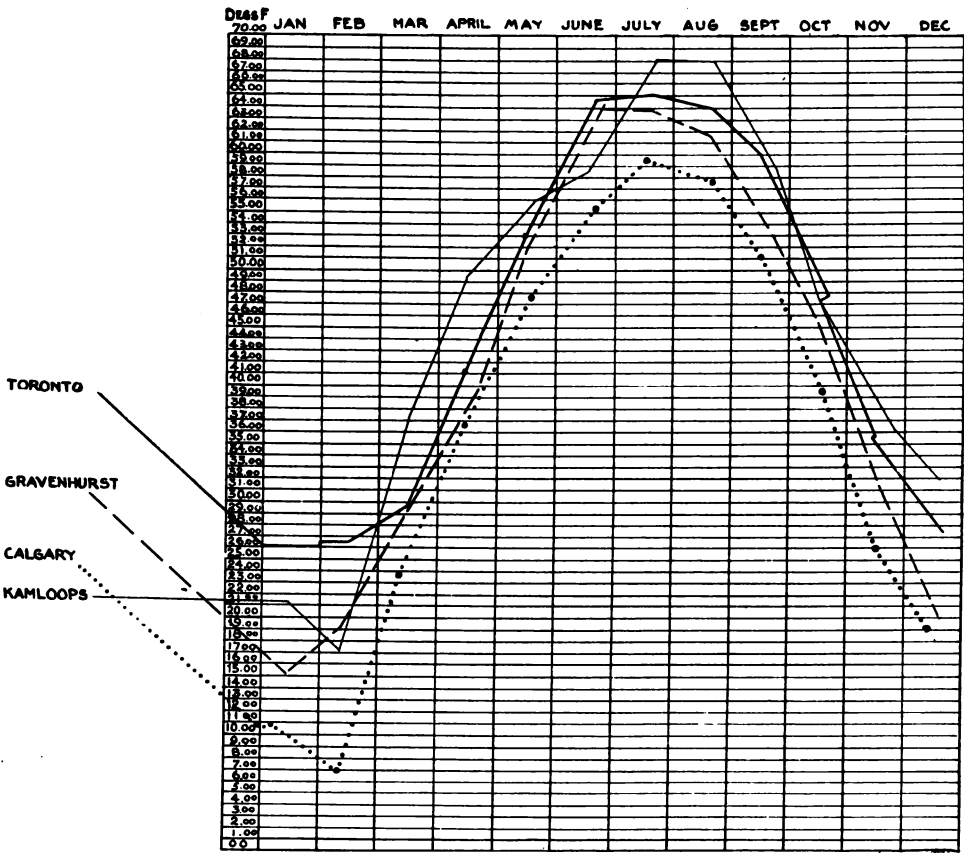
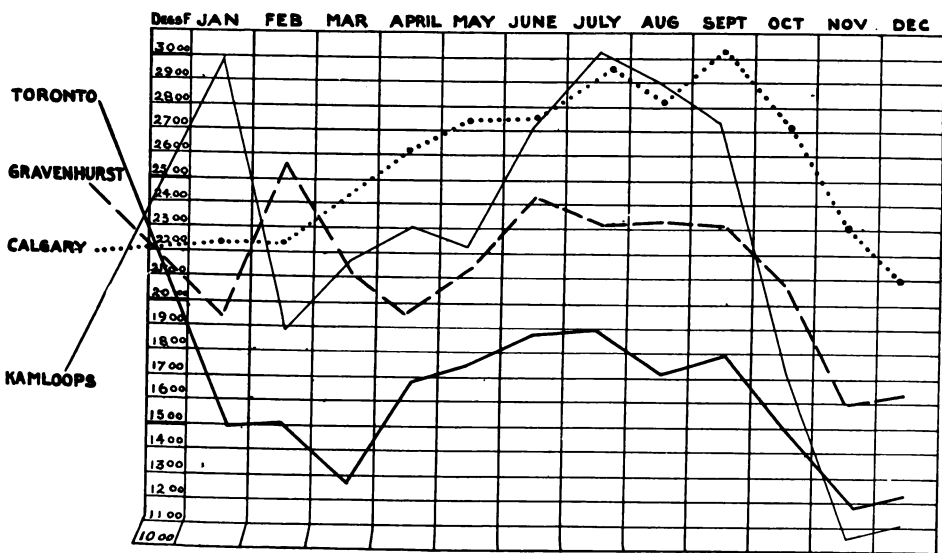
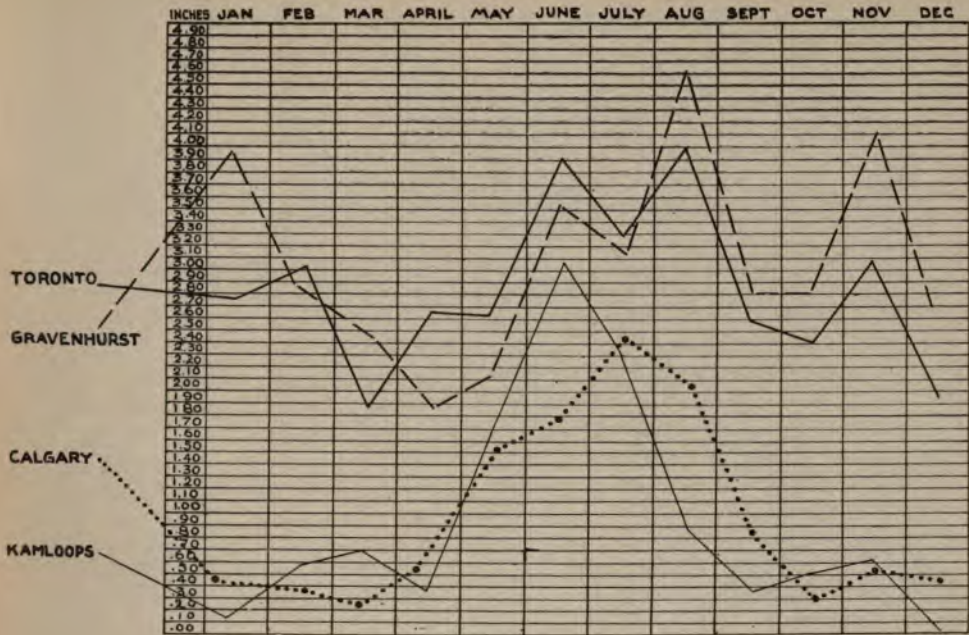


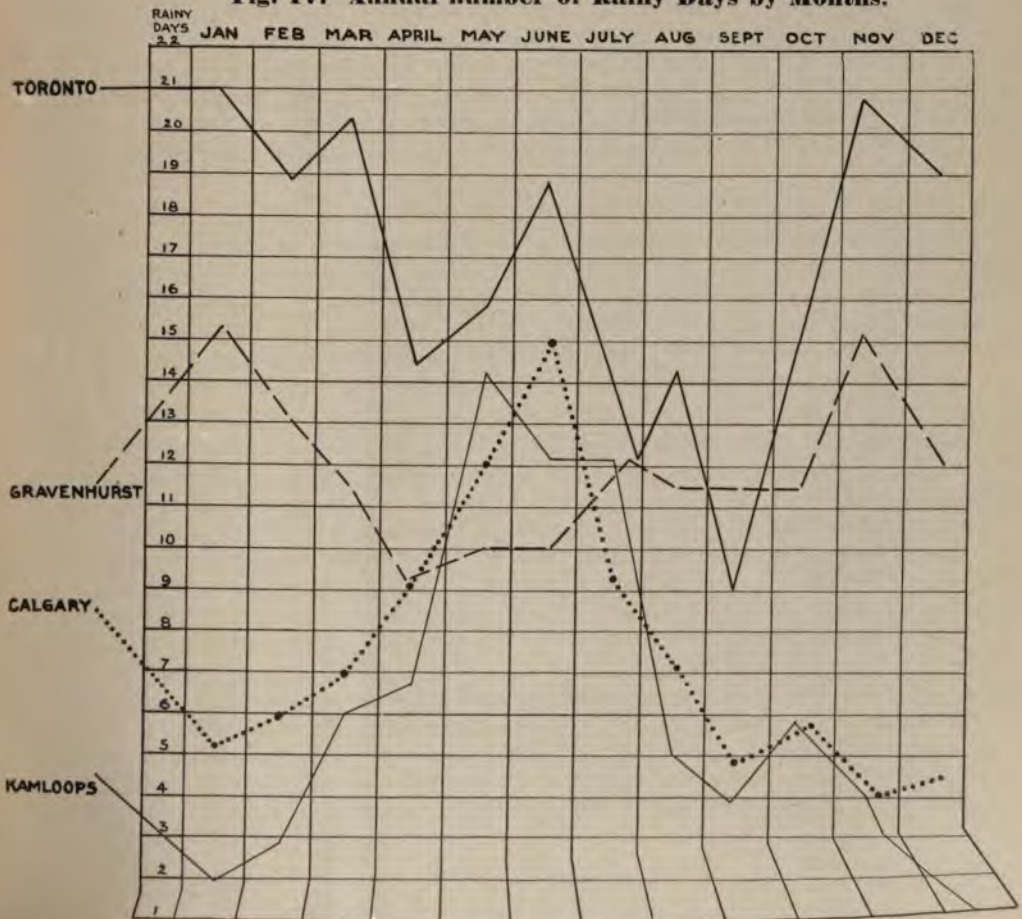
Fig. II. Mean Daily Range of Temperature.



**Fig. III. Annual Rainfall in Inches.**



**Fig. IV. Annual number of Rainy Days by Months.**







## CHAPTER IV.

### CONTAGIOUS DISEASES IN CATTLE AND CATTLE INSPECTION.

In the evolution of public health work in America, as on the continent of Europe, legislation naturally took cognizance of those diseases, which, appearing as pestilences, not only resulted in the destruction of thousands of human lives, but also created most serious losses to trade and commerce, paralysing often the whole business of such cities and districts as might become subject to their ravages. Associated with such legislation, were investigations into the causes of these diseases, and in the classical reports of the Local Government Board of England we find fully detailed, the results of such enquiries regarding the prevalence of cholera and typhus, the types of epidemic diseases. Following closely upon the work which resulted in the development of public water supplies and sewerage systems for cities, and in the opening up of wider streets and the erection of model dwellings in the place of the pestiferous closes and old buildings, began enquiries by the public health authorities into the causes of diseases, such as rinderpest, and foot and mouth disease in England, and of anthrax or charbon in the herds of France. Indeed, it was in the latter field, both as regards isolation and preventive experimentation, that the most striking results of modern scientific investigation have been obtained. Following the lines of investigation begun by Chauveau and Davaine, the immortal Pasteur with that insight, which has made his work the type of all inductive science, pushed his inquiries into fields of research, as yet untrodden, and gave to the world those methods, which have only needed the rays from his lighted torch to enable his followers to peer into the hidden recesses of Nature, and thereby reveal to a sceptical world, the wonders of her *mysteria*.

Illustrating this by the one example of anthrax, we have a disease which for over two centuries has appeared as an epidemic both in men and animals in Europe; which in A.D. 1617, is said to have caused 60,000 deaths in men in the one city of Naples, and which so late as 1864, destroyed in one province of Russia, 64,000 animals and 525 men; and yet which within a few years thereafter, through Pasteur's studies, has almost disappeared from France, where it had been for years the cause of the loss of millions of francs annually.

As in the case where the epidemics of cholera, typhus and of smallpox, were soon followed by the investigation of diseases characterized as endemics, such as typhoid and diphtheria, rather than as *maladies fulminantes*, we find Dr. John Simon, in the Public Health Report, England, of 1862, stating, "Allegations have during the last few years been abundantly made, and have with the progress of time, become more and more definite, that the flesh of animals slaughtered while in a state of disease, and likewise the milk of diseased animals, are extensively sold for human consumption in the United Kingdom. And the substance of these allegations has been submitted to the Lords of the Council. In 1862, their Lordships ordered an enquiry to be made in this matter, and under their directions I requested Mr. John Gamgee, Principal and Professor in the Edinburgh New Veterinary College, to report on it. For your Lordship's purpose it was likewise desirable, that enquiry should be made as to the circumstances under which the more important diseases of stock prevail in the United Kingdom, and particularly into the influence of importation and of home-trade in spreading the infection of such diseases."

In this enquiry Mr. Gamgee was instructed to visit infected centres in the United Kingdom, and also those parts of the continent whence came most of the imports.

Dr. Simon states that the substance of Mr. Gamgee's report then published, was "that disease prevails very extensively in the United Kingdom among horned cattle, sheep and swine; that the diseased state of an animal not only does not commonly lead the owner to withhold it from being slaughtered for consumption as human food but on the contrary in large classes of cases (especially where the disease is of an acute kind) leads him to take immediate measures with a view to this application of the diseased animal; and that consequently a very large proportion (Mr. Gamgee believes as much as a fifth part) of the common meat of the country—beef, veal, mutton, lamb and pork—comes from animals which are considerably diseased."

Mr. Gamgee classified the diseases as, (1) contagious fevers; (2) anthracic diseases; (3) parasitic diseases. In the first were pleuro-pneumonia and foot and mouth disease, and in the second, anthrax and black-quarter, and in the third, measles and trichina in the pig, and liver-fluke in the sheep.

Mr. Gamgee is further quoted as stating "that the flesh of all such diseased animals is being very largely sold for consumption as food; that carcases, too obviously ill-conditioned for exposure in the butcher's shop, are abundantly sent to the sausage makers, or sometimes pickled and dried," "and that the principal alternative, on a large scale, to the above described human consumption of diseased carcases is, that, in connection with such slaughtering establishments, swine (destined themselves to become presently human food) are habitually fed on the offal and scavenger of the shambles, and devour often raw, and with other abominable filth, such diseased organs as are below the sausage maker's standard of usefulness."

As to the effects of the use of such diseased meats as foods, some remarkable instances of fatal results are given by Dr. Simon, and a notable one quoted by Mr. Gamgee, where the meat taken from a sick animal treated with tartar emetic, caused sickness in 321 persons who ate it, and death in one case.

Dr. Simon, further with his remarkable insight, speaks of "the question of meats being rendered unwholesome by decomposition, and the question of meats being rendered unwholesome by disease." "Among the cases which I see adduced as illustrations of mischief from diseased meat, are some which, for aught that appears, may only illustrate the well known fact that even in presumably healthy meat, poisonous properties, different from those of common putridity, are sometimes developed by decomposition."

Mr. Gamgee is finally quoted as stating "that a very large proportion of the disease which now habitually prevails amongst live stock in the United Kingdom, and which he estimates as proving fatal to stock to the immense pecuniary amount of more than six millions sterling, might by proper measures be prevented."

These extended extracts have been given as being of special interest in illustrating what seems to be the first attempt at an accurate scientific investigation in England of the diseases of cattle, and, whether viewed from the sanitary or economic standpoint, they present a picture than which nothing would seem more horrible or gloomy.

Amongst the most remarkable epidemics amongst cattle in England, was that of the Russian cattle plague or rinderpest, or *typhus boum contagiosus*, which



was introduced into England by Russian cattle in 1864, and within a year, the total number of cattle on farms in Britain, where the disease had appeared, was 159,710, while the total attacked was 73,549 of which 41,491 died.

The activity of the Cattle Commission stamped out this disease, only after frightful losses, by segregation and by destroying all animals which had been exposed. It reappeared to some extent in 1872; but with the more chronic diseases of pleuro-pneumonia, endemic in most European countries at this time, it was not until 1888 that the pleuro-pneumonia Slaughter Order of the Privy Council was passed, requiring all cattle being, or having been in the same field or other place, or otherwise in contact with the diseased to be slaughtered within ten days from the exposure.

It is very remarkable that in the Public Health Reports of Dr. Simon, of the Local Government Board, nothing is said concerning the two diseases of cattle, which to-day, whether in England or in America, are attracting in the greatest degree the interest of both public health authorities and veterinarians, viz., tuberculosis and actinomycosis. As amongst the diseases of mankind, it seems probable that they have been practically disregarded, in the presence of the diseases which like rinderpest in cattle or cholera in man, appear in epidemic explosions.

Hence to-day, as all health authorities have only begun to seriously have their attention drawn to prophylaxis, and to measures for restricting the spread of contagion in human tuberculosis, so have they only begun to realize that bovine tuberculosis and actinomycosis, from their very chronicity possess dangers more wide-spread and permanent than many of the more acute diseases.

The history of veterinary medicine in the United States is of much more recent date. We have almost nothing printed concerning animal diseases, until after the civil war. Massachusetts has a history of existing pleuro-pneumonia in 1859-65, but much apathy and indifference resulted regarding it, and owing to ignorance the merest spasmodic attempts were made to deal with it. In 1863, however, a commission of the Legislature was appointed with powers to deal with it, but was largely inoperative, as even some of its members doubted the infectious character of the disease; but the disease continuing to spread, the slaughtering order was enforced in 1866, and 1,164 cattle were killed by the commission, and others by the municipal authorities. The disease in this outbreak had been introduced in cattle from Holland. In common with other States, the disease re-appeared in 1882 in cattle imported from England, and its reported presence in several States resulted in the slaughtering order of the Department of Agriculture of Great Britain, at the port of entry, which has continued ever since.

In 1879, a cattle commission was appointed to deal with the disease in New York State; while in New Jersey in 1881, cattle diseases were placed under the charge of the State Board of Health. Then, as in Europe, this type of progressive contagious disease, had been shown to spread only with the movement of cattle in transit, and hence until the importation of thoroughbred cattle from Europe for breeding purposes began with the rapid settlement of the western prairies, and the movement eastward of cattle to the eastern markets, little was heard of cattle diseases in the United States.

The same may be said regarding diseases of swine. The export trade in American bacon had become well established, when in 1879, the continental countries, which used largely hog products, became frightened at the reported presence of *trichina spiralis* in American bacon, and Italy first, and then afterward

Hungary, Germany and France had, by 1881, prohibited the importation of American bacon. While the excitement spread to England, yet no order of exclusion was passed.

The west had already become a producer and exporter of hog products. In 1865, the Union stock yards of Chicago were first established, and by 1883, it was estimated that there were 11,179,000 cattle in the States and Territories west of the Mississippi, with an almost incalculable number of hogs. The exclusion of these hog products from the European market in 1879-1880, and the Slaughter Order in 1882 for cattle entering the ports of Great Britain, proved almost fatal to the export trade of the United States in animal products; but it illustrates how utterly inadequate any attempt at State inspection and control of the health of animals had proved.

Such then was the situation up to 1881, when the Federal Government began its work. It established in that year quarantines at Baltimore, New York, Boston, Portland and New Orleans; and while an order was made at the same time for a ninety day quarantine against Canadian neat cattle, it was rescinded shortly afterwards, since the Canadian quarantine for such cattle from Europe was found to be similarly ninety days. In the same year the United States Federal Government appointed a committee to study the several phases of the pork industry; but up to 1884 had not succeeded in having any of the restrictive measures *re* foreign importations rescinded. It is somewhat curious, as it would seem to have its parallel in some recent Canadian reports of cattle inspection, that Commissioner Scanlan, of the Washington Bureau of Statistics, in 1884, reported that after most careful investigation, he could find no trichina and no hog-cholera in American hogs, and that packing establishments used only the most healthy animals for packing.

This state of affairs became intolerable, and the first step towards permanent work, was taken when Secretary Folger, of the Department of Agriculture, Washington, established the Bureau of Industries by an Act of Congress, dated May 29th, 1884, and issued an order August 10th, 1884, requiring all persons having Jersey cattle in the United States, not to ship cattle in the meantime under a penalty of \$100 to \$5,000 for violation of the order. Since that period the progress of the work of the Bureau and the extension of the co-operation of its officers with State authorities has become most noteworthy. The principle adopted early was freedom of State action; but when State authority was lax, the Bureau would carry on investigations and issue slaughtering orders in cases of contagious disease and give the compensation provided for under the State laws. Realizing that the meat industry ranks third in importance in the export trade of the United States, it was most natural that when fully realized the work of protecting and fostering it should be encouraged in every way possible. In view of the exclusion and its rigid maintenance on the continent of Europe against the hog-products of the United States, the exports of which had realized in 1881, \$104,660,000 to all countries, Congress passed an Act providing in Regulations, dated March, 3rd, 1891, for a microscopic examination of the tissues of hogs at the time of slaughter, in order that certificates that the same were free from *trichina spiralis* might be issued; and also for an inspection of all hogs slaughtered for export or for interstate trade.

This order supplemented one made on October 30th, 1890, for the systematic inspection and marking of all cattle and sheep intended for export.

Turning to a review of the diseases of cattle in Canada it will be found that the Report of the Department of Agriculture established at the time of Confederation, practically makes no mention of agricultural matters, while deal-



ing extensively with matters of immigration and quarantine. Reference is made, in the report of 1871, to an investigation ordered by the Lieutenant-Governor of Ontario, and carried out by Andrew Smith, V.S., of Toronto, and Dr. Nicoll, into the reported presence of an "epizooty" amongst stock in that Province. The result of the enquiry states that the disease existing was of a mild character, and was nothing more than that caused by a species of fly prevalent that summer. The "epizooty" existed in Illinois and it was supposed that the disease had been imported. The report of 1869 refers to an Act passed by the Parliament of Canada for restricting contagious diseases in cattle, while the report of 1887 makes mention of the fears of the introduction of an epizootic which had been then prevalent in Britain and the Continent, causing annual losses of millions of pounds. This refers to pleuro-pneumonia already made mention of.

The cattle quarantine seems to have been established about 1875, since the report of 1876 refers to the fears regarding the importation of the epizootic then existing in England and on the Continent. The report of 1884 makes mention of the outbreaks of cases of foot and mouth disease on two vessels importing cattle for breeding and refers to the limiting of the disease to the animals of the two vessels, although 800 cattle were in the Quebec quarantine at one time, and fifty persons were engaged amongst them. It is further mentioned in the report of 1884 that the importation of "neat" cattle into Canada was greatly lessened that year, owing to the fear of pleuro-pneumonia then existing in England. The report of 1883 states that the export cattle trade has ceased to be an experiment, while that of 1884, by Mr. McEachren, V.S., Chief Inspector, makes special mention of the good trade to be seen in *stockers*, i.e. cattle to finish for market on the English pastures. The report of 1884, and several other years, refers to a localized epidemic of scab in sheep in the Laprairie district near Montreal, and to the Pictou cattle disease, which in 1893 was fully reported upon by Prof. Adami, of McGill University. Reference appears in the 1883 report to a ship with "Texas Fever" from Canada, being seized in the Mersey, but is afterwards released on protest of Sir Charles Tupper.

We thus see from these reports, that no reference had been made to either of the diseases, tuberculosis or actinomycosis, illustrating, as do the histories of cattle diseases, both in Britain and in the United States, the fact that only the more rapidly spreading epidemic diseases had been investigated or dealt with. To the credit of Canada, it may, however, be asserted that the quarantine for imported cattle was on a systematic footing before the United States took action, and that the latter country took up the work of cattle inspection by federal legislation only after the export cattle trade made the work a necessity in the interests of commerce. Owing to the relatively higher status of Canadian stock through the importation of thoroughbred animals for breeding purposes, to their inspection on entry, and to the cattle being better cared for, together with a healthier climate, we see that Canadian stock, isolated on small farms, and not running free in large herds as on the western plains, have hitherto enjoyed a reputation for healthiness, which has allowed the expansion of our cattle trade to go on, unimpeded by vexatious restrictions at the ports of those countries receiving most largely our exports. In the report of 1883, the absolute immunity from disease of Canadian cattle is remarked upon as one of the main factors in the prosperity of the trade.

As already seen in the progress of veterinary science in Britain and on the Continent, it was natural that as in medicine, attention should begin to be directed within the last ten years to those endemic diseases, of a more chronic character,



characterized chiefly by mal-nutrition and wasting, and which with the progress of biological science came to be suspected, after the discovery of the bacillus of tuberculosis by Koch, and its capacity for transmission by inoculation to animals, as being probably of zymotic origin and therefore communicable. Glanders in horses had been long suspected as being communicable, and indeed, a special Act had been passed by the Ontario Legislature in 1884, enabling local authorities and magistrates, to deal with it, and requiring all veterinarians to notify a magistrate of any cases discovered by them. The Animals' Contagious Disease Act of Canada, passed in 1885, named the following diseases as being contagious or infectious, and being those for which compensation was to be given, while actinomycosis has been added to the list during the session of 1896. The expression 'infectious or contagious diseases' includes, in addition to other diseases generally so distinguished, *glanders, farcy, mange, pleuro-pneumonia, foot and mouth disease, anthrax, rinderpest, tuberculosis, splenic fever, scab, hog cholera, hydrophobia, variola ovina and actinomycosis*.

From the summarized history which has just been presented, it becomes manifest that in Canada, as indeed, in all countries, the study of veterinary medicine has relatively a very brief history, and must in practice, be considered as having taken its position as a science, only within the last thirty years. Its development has had much to aid it, especially from the standpoint of commerce; for with the development of rapid steam transit, as has been seen, came the possibility of the development of the live cattle trade between America and Europe. Owing to the enormous number of cattle exported from North America, and the developing trade even from South America, and the numerous ramifications of the interstate and inter-provincial railway transportation, the last fifteen years have seen the evolution of a totally new state of affairs, which has demanded the attention not only of cattle-owners, shippers, and transportation companies, but also both of Federal and State Governments on both sides of the Atlantic. Along with the importations from all parts of the American continent into Britain, the dangers of the spread of communicable disease from one state to another, with interstate commerce, have similarly greatly increased, as well as the possibility of diseased animals carrying the contagion to the ports of entry in Europe. Not only this, but the facts which soon came to be learned that a most profitable trade could be developed in the exportation to Britain of well grown, half fattened beasts, called "stockers," to be prepared for the market on the rich pastures of some British county, added an additional element of danger of the introduction of disease into Great Britain. This was soon realized, when after the severe outbreak of Texas Cattle disease on the south-western plains, and the presence of pleuro-pneumonia in some of the Eastern and Central States, the Order-in-Council, of the Department of Agriculture of Great Britain, of 1882-3 was passed requiring the slaughter of all United States cattle at the port of entry in Great Britain and which has been continued ever since. This became of great incidental advantage to the Canadian cattle shippers, who were not slow to make the most of it, and while being at all times loud in condemning the introduction into Canada of American cattle, have, on the other hand, been equally strong in the praise of our Canadian herds seemingly so free of disease.

As a consequence of this condition of affairs, two very remarkable phenomena resulted; *first*, there came a stasis in the healthy activity which had begun to characterize the work of cattle inspection in Canada at the time when the Contagious Diseases Animals' Act was passed by the Federal Government of Britain in 1879, and a tendency to rest, if not on our laurels, at any rate on the fortunate accident of the healthfulness of Canadian herds; and *second*, there has resulted a *full realization by the Government of the United States of the perils which their*



export—and even internal—cattle trade might soon be subjected to if comprehensive, scientific and thorough measures were not promptly adopted for meeting the situation.

We have already seen how the Bureau of Animal Industries of the Federal Government of the United States, a mere tentative department ten years or more ago (being established first by Congress in 1884), has extended its operations until we see it in 1895 establishing under new legislation, even an interstate cattle inspection, superadded to that of the previous legislation of 1887 for the inspection of cattle for export; which, added to the laws establishing cattle commissions in some fifteen states, has caused a development of the work of investigation and stamping out of cattle diseases, the importance of which upon the relative standing of Canadian cattle in the European market does not seem to have yet been realized by the Canadian legislator or stock-breeder. (See U. S. laws referred to in Report on Inspection of Meat and Milk, Part II.)

To illustrate the operation of these laws, I cannot do better than present a summary of what anyone may see in daily operation at the Buffalo cattle market. Buffalo by its situation is most favorably placed for the building up of a large cattle market, and boasts to-day of being the largest sheep market in the world, over 6,000,000 sheep being handled at their local market in 1895. To-day there are forty-four acres covered with cattle yards and pens; and a new company has recently begun new yards with an area of sixty acres. In addition to the local city market of a population of 350,000, there is one long established and very large packing establishment, and several smaller ones engaged especially in the local and interstate trade. As will be seen by the Act already referred to, the railway companies can only transport to outside any state such animals as have obtained local bills of health. Brought to the Buffalo market they are at once drafted to different pens, those for local slaughter being inspected by city inspectors, and those for export or interstate trade being examined by Federal inspectors, who likewise examine all intended for slaughter in the one packing establishment having Federal inspection through asking for registration and by consenting to submit to the regulations of the Department. It is confessed by the city officials that the local staff is insufficient for an efficient inspection, but they cover the ground as far as possible. As will be seen in the following figures, it seems absurd that two or three city inspectors can have inspected 5,049,473 cattle, hogs, sheep and calves in 1895; but such is stated in the mayor's annual address.

This is all the local inspection that is done except to look up local nuisances at the numerous butcher shops of the city and suburbs, where a large part of the local supply is slaughtered. The city health authorities are anxiously asking for one or more abattoirs for extending the local inspections.

Returning, however, to the Federal inspection service, we find a staff inspecting every animal, either in the pens or on being weighed. Those showing disease or injury are placed into quarantine after being tagged and numbered and a short description of the animal taken. Those for slaughter in the registered packing-house are driven off as required to the yards of the packing-house, and there again carefully inspected as they are sorted into grades of different quality. Further inspection not having revealed any disease, the cattle pass on to the slaughtering floor. While being skinned and dressed each animal is carefully inspected by the veterinarian, the lungs, glands and intestines being examined especially for the detection of tuberculosis. When found healthy the meat is tagged "Inspected" with a numbered tag of the Bureau of Animal Industries, and the meat passes into the cooling chamber either for local use, interstate trade or for export.

All interstate packages have to be made up of meat bearing on each parcel the blue stamp of inspection by the Bureau Inspectors. If a carcass while dressed is found diseased in its lungs, etc., to any serious degree it is ticketed "Condemned," its number taken, and it is followed by the inspector to the "Rendering tank," where it remains until he sees it destroyed for food. Pigs and sheep are inspected similarly to cattle, both at the pens, stock-yards and in the yards of the packing-house. After killing, the internal organs of hogs are placed on a table in front of the inspector, who examines for swine-plague and hog-cholera, measles, etc. If diseased the condemned tag is attached and the carcass afterwards goes to the rendering tanks. In addition, however, to this inspection several small pieces are nipped off by scissors from different muscles, numbered the same as number of tag on carcass and taken to a room where are young women specially trained to examine with the microscope for trichina. The specimens from each animal are examined by two separate examiners, one in forenoon and one in the afternoon, and if the trichina is found the whole carcass is condemned without reserve. All packages for export, as before, receive the brand of the Bureau of Animal Industries.

Returning to the inspection of cattle intended for the wholesale trade or export, they are inspected individually, and if found healthy to outward appearance they have a metal tag punched into the ear with a number of a continuous series, and a detailed statement of the numbers in any given lot is daily made and forwarded to the Central Bureau at Washington; also a note of any animals condemned, stating cause. These animals tagged as inspected are admitted to interstate trade, but if for export are again inspected before going on board ship.

So complete is the system of registration that as an inspector in the Deptford market, London, stated to a Canadian friend, "The Americans are quite surpassing you Canadians, for we can trace any animal found diseased by that tag back to the very farm it may have come from in the Western States. We are getting afraid of your Canadian cattle." The quarantined animals at the yards are further examined, and if proved diseased on killing are all *tanked*, as the expression is. This work is being extended to the investigation and stamping out of tuberculosis and actinomycosis by inspection of herds. The latter must necessarily be largely carried out by State authorities, and as seen in the report contained in Part II. of this report, the work is in many states being vigorously prosecuted, compensation being given in every case.

We very naturally enquire what stage similar control and inspection has reached in Canada? We have already quoted references to show that Canada was early alive to the interests of this most important industry. We notice, too, that since the threatened scheduling of Canadian cattle in England, owing to reported cases of pleuro-pneumonia in exported stockers in 1892, 1893, much concern has been shown to prove that our Canadian cattle are free from this, and indeed all other diseases. The scheduling order was finally made in 1896, so that the favored position of Canadian live cattle exports extending for over ten years over United States exports has disappeared. Assuming what seems to be true that no cases of contagious pleuro-pneumonia have in England been proved against Canadian cattle, are there, therefore, no good and sufficient reasons existing in England for the issue of such an order? To answer this we have to examine the exports annually issued by the Dominion Department of Agriculture, and judge of our situation when placed alongside of the measures adopted in the United States to raise the standard of their cattle, even though scheduling *continues*.



The chief veterinary inspector, in his last report, states that out of a total of 99,606 cattle landed from Canada at British ports in the year ending November 1st, 1895, not a single case of pleuro-pneumonia could be discovered.

"Not only is this the case, but your inspectors have been very seldom called upon to investigate any diseases in the country—that in fact with the exception of tuberculosis and actinomycosis, and a few cases of scab in sheep, no diseases of a contagious nature exist in the herds or flocks of Canada. The healthiness of the stock generally in this country is almost phenomenal." Again—"The number of herds infected by this disease (tuberculosis) during the past year has greatly decreased in Quebec and the Maritime Provinces, due, no doubt, to the owners of cattle being now generally well informed of the incurable and dangerous nature of the disease, and the ways in which the infection is spread, more care in adopting preventive measures being exercised by them."

The percentages of tuberculosis in lungs examined at Quebec, Halifax and St. John, were respectively 2, 1½ and 2 per cent. Dr. A. Smith, of Toronto, chief inspector for Ontario, in speaking of the 927 pairs of lungs examined at Toronto, Hamilton, London and Galt, makes no mention of tuberculosis.

It must be presumed that the chief inspectors at the port of embarkation have carefully examined all animals exported. Of the 99,606 cattle shipped, fifty-seven lame, fifteen old and poor, one with mange and sixty-seven with lump-jaw, are stated to have been detained, and not one was found to be tuberculous. There would seem to be included in the staff for the whole Dominion fifteen veterinary inspectors and seven who report as customs officers at small ports of entry. These would not appear, from the few cattle reported, to be continually engaged in inspecting cattle at ports of entry, and several of the number are guardians of cattle yards principally where American cattle pass through the Lake Erie peninsula in transit. From this staff performing such work as comes to hand, we have to look to obtain the exact information which goes into the annual reports. In direct contradistinction to this, it is learned that the staff of the chief inspector at Buffalo for carrying out the regular work of daily inspection of the Bureau of Animal Industries is twenty-three, including veterinarians and others. *With an animal population of over 5,000,000 cattle, over 3,000,000 sheep and over 1,000,000 hogs in the Dominion, it is apparent that broad statements made on the strength of what such a staff of observers only occasionally and incidentally—not entirely—engaged may discover of tuberculosis, for instance, must, if published, only serve to cast doubt upon the accuracy of other statements with regard to pleuro-pneumonia or any other suspected disease.*

The following notes *re* complaints made to this Board during the past year illustrate how unsatisfactory the situation is with regard to the local inspection of animals and how conditions prevail that cannot fail, if allowed to continue, to result disastrously to the reputation of our live stock trade.

Feb. 18th, 1896.

JUDGE DARTNELL, Whitby:

Enquiry as to amendments to law in a case *re* an animal undoubtedly suffering from actinomycosis, animal was sold by farmer to Port Perry tailor, who refused payment on advice of veterinary, that animal was deceased. The judge has learned that cases of the disease are frequent. Judgment in the case was given for plaintiff, \$26 and costs.

October 23rd, 1895.

H. H. DEWART, Toronto:

Enquiry *re* costs in prosecuting knackers for throwing out carcasses of dead horses to be eaten raw by pigs in York township.

February 24th, 1896.

Dr. A. CAMERON, Owen Sound:

Statement *re* herd of twenty-nine cattle, healthy up to a year ago, when a two-year old animal having a lump on right jaw was introduced among them. At date of this letter thirteen out of twenty-nine had become affected. It is firmly believed many neighboring farmers have killed animals they could not sell, and have sold the carcasses. There are many diseased animals in this neighborhood.



January 2nd, 1895.

J. BOWLER, V.S., Chairman Government Board Inspector of Stock, Windsor :

Reports a cow dead from tuberculosis at a milch farm near Windsor, and no doubt it can be traced to other farms.

This is being kept private awaiting your action in the matter.

June 10th, 1895.

R. KING, Barrie :

Asks if there is law to prevent feeding dead animals to pigs.

February 1st, 1895.

Dr. GAVILLER, Grand Valley :

We have a large percentage of cattle in this part suffering from actinomycosis.

Some have been undoubtedly slaughtered by local butchers and sold as food. One head with two tumours was found recently in a pig-stye at rear of slaughterhouse.

December 26th, 1895.

J. SAVAGE, Newmarket :

I learn a man on the third concession had a cow fattening which had several cancers, and that he milked and sold her milk to the cheese factory when she was in a bad condition.

February 26th, 1896.

FRANK DODGE, Secretary Local Board of Health, Ameliasburg Tp., Prince Edward county :

Reports that within three miles of Picton, lives a man who has already fed the carcasses of 150 old worn-out horses to pigs. There is also a man who goes through the county endeavoring to buy horses, and sells the hides for \$1.50 and sells carcasses to these men to feed to pigs.

September 3rd, 1895.

R. A. SINCLAIR, Secretary Local Board of Health, Cannington :

Re a nuisance in the matter of a large slaughterhouse in village, and demanding that action be taken in matter by this Board.

May 15th, 1895.

ALEX. WALDIE, Brighton :

The Local Board of Health has not stopped slaughtering complained of. He has been killing all day. He has twenty or more hogs and no floor. He cleans them out once in six months. If it is not stopped no one can live for bad smell and flies. The pen is not thirty feet from the street.

October 5th, 1895.

G. W. WEBSTER, Secretary Local Board of Health, Ottawa, East :

Writes re nuisance caused by slaughterhouse along the street. Promises to abate nuisance. All the family near by was very ill. The stench is insufferable; original complaint made by J. C. Bauld, and local board has taken action.

September 13th, 1895.

ABRAHAM NEELANDS, Invermay :

Slaughtering within corporation used for curing hides, drying skins and rendering fat. This goes alongside the warm meat left over night. Swine kept in small enclosure in immediate contact with slaughterhouse and are fed raw offal.

November 9th, 1895.

Dr. HARBOTTLE, Burford :

States old horses are reported being shipped to Toronto extensively for fertilizer, probably for sausages.

February 8th, 1895.

D. R. BEATON, Pickering :

Re feeding dead horses raw to hogs.

February 9th, 1895.

Secretary St. Catharines Waterworks :

Re a farmer feeding dead horse to hogs ; owner " said it was easiest way of disposing of it and did not hurt the horse."

March 4th, 1896.

ALFRED SKIPPEN, Medical Health Officer, Luther township :

States in that neighborhood " Vets." state there are some hundred cattle affected with tumors of the jaw, actinomycosis, and that they cut them out, sew up the wound, when the cattle are shipped to Toronto. He asks for an investigation.

January 18th, 1895.

D. CAMPBELL, Uxbridge :

Complains of a hog-feeding establishment within the town, where some 200 hogs are kept within 100 feet of nearest house. A remedy is sought as local board will do nothing.

- March 7th, 1895.
- R. T. FOLLIS, Chester :  
Reports a case where an animal diseased with cancer was seized and the owner fined \$25.00 and costs.
- March 15th, 1895.
- EZRA BRIGGS, Bruce county :  
Writes regarding an animal with cancerous tumor, whose milk was used.
- August 16th, 189.
- W. H. HALL Medical Health Officer, Chatham :  
Stated that the meat of an animal with cancer of the jaw was seized, and on proof of cancer a fine was levied.
- August 16th, 1895.
- DR. HUTCHINSON, Medical Health Officer, London :  
Stated a similar case as occurring in that city.
- January 23rd, 1896.
- S. E. THOMPSON, V. S., Warkworth :  
Writes twenty cattle were tested, fifteen out of the number were found affected with tuberculosis, four were slaughtered and the disease found to be well matured.
- April 4th, 1896.
- A. T. REID, Orillia :  
Reports a number of cattle as suffering from a disease resembling tuberculosis.
- April 9th, 1896.
- W. R. FELLOWS, Secretary Board of Health, Blenheim :  
Asks for information *re* the law as to inspection of meat, and states that it is greatly believed that lump jaw is very prevalent in the neighborhood.
- February 21st, 1896.
- M. CAMPBELL, Mayor, Chatham :  
Writes that the council and himself are anxious to pass a by-law *re* the inspection of meat and cattle, and trusts the same will be done at once.
- March 14th, 1896.
- H. COUPE, Walkerton :  
Reports a number of cases of lump jaw in cattle in his neighborhood, and attributes cases of cancer in human beings as being due to this disease.
- March 28th, 1896.
- J. EDWARDS, Moorefield :  
Writes concerning a cow he bought suffering from lump jaw, and states that when the cow was killed that the liver and lungs were ulcerated.
- April 23rd, 1896.
- W. J. DOUGLAS, Secretary Board of Health, Eglington :  
Reports that certain cattle in his neighborhood are supposed to be suffering from tuberculosis.

The work done by municipal authorities, supported by ample legislative enactments is certainly most limited and unsatisfactory in the work of protecting against disease; and, as has been shown in the United States, no state legislative action has been effective in dealing with the inspection of cattle. Encouraged however by the comprehensive, systematic and scientific work of the Federal Bureau of Animal Industries, the State legislatures have within the past three years supplemented very largely Federal action. As in a peculiar sense the movement of cattle becomes interstate and interprovincial for purposes of commerce, it is quite apparent that nothing can be effective in Canada unless begun from this standpoint by the Federal authorities. When it is remembered that from 1889 to 1894 the export cattle-trade of fat cattle, of the United States, even with the embargo of the English schedule on all stockers was 22.5 per cent., while in Canada without any embargo and with the freedom to enter stockers, the increase of our export cattle trade was but 1.7 per cent., it is quite apparent that those interested in this important part of our national prosperity will do well to be guided by facts and not by self complacency.

P. H. BRYCE,  
Secretary.



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## PART II.

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## PART II.

### CHAIRMAN'S ANNUAL ADDRESS.

BY DR. J. D. MACDONALD, HAMILTON.

*To the Members of the Provincial Board of Health :*

GENTLEMEN,—In coming together again at the beginning of another year, it is allowable for us to express our pleasure that we see one another in the enjoyment of health and of fitness for the duties of our office; with our membership not diminished, and with a reasonable expectation that all may continue fit for such work as may be assigned to them during the months which are before us.

There is cause also to notice with satisfaction the general state of healthfulness with which the Province, as well as the Dominion at large, has been favored. No destroying epidemic has caused general suffering or loss of life. The sanitary authorities throughout the country seem to have been in a great measure watchful and active in efforts to stop the progress of such infectious maladies as may from time to time have broken out.

Small-pox has been an old subject of bitter reflection to this Board, appearing chiefly in the lumbering districts, being brought thither by vessels from the American side. It may be remembered that strong complaints were made by our committee on epidemics of the great want of precaution, on the part of our neighbors across the lake, against the increase of this malady, and of our suffering which ensued. It is a satisfaction to us to hear that both the supineness on the one side and the suffering on the other have come to an end in the meantime.

It has to be observed, however, that those outlying districts of our Province, communicating much, as they do, with the American side, require the continued exertion of watchfulness. The immigration into the States from so many regions of the globe will assuredly be accompanied by much infectious disease, of which an unwelcome share will reach us, and will spread among us and prove destructive, unless we are always prepared with an active organization for the purpose of stopping its progress.

It should not be again necessary to refer here to vaccination. It might be assumed that a moderately informed public is persuaded that the alternative presented to it being small-pox or cow-pox, the easier and safer experience is that of the latter. It has, however, to be admitted that boards of health and the medical profession still find it necessary to present, with what force they can, the advantages accruing from the choice of the lesser evil.

When at our last annual meeting, I had the privilege of addressing you, there was reason to refer to Asiatic cholera as an affliction from which, by a kind Providence, we had escaped. It was thought that we could justly give expression to a well-grounded feeling of security from that baleful malady from henceforth. It was conceived that late experience had proved that, by good organization on the part of sanitary officials at the various sea ports, the entrance of cholera into this continent could always be prevented; and no doubt it can be, if men and nations are only contented to pursue the paths of peace; but, men are not pleased to continue in these paths, and semi-savage Mohammadans are only a little in advance of a so-called Christian civilization in their readiness for general murder.



It would not have been thought necessary to revert to the subject of cholera on this occasion, were it not that the disturbed social and political state of those eastern countries in which cholera so often prevails, has led many to anticipate an outbreak of the scourge there. It may be supposed that, with the accurate knowledge of the origin of the disease, to which men have now attained, it will be an easy matter to prevent it from going beyond its more favorite seats. It is better for our Boards of Health, that they be themselves prepared to combat with this enemy at our own doors. Conditions seem threatened in the Eastern world and in Europe, if not also in America, which may place sanitary precautions in the background, and it may require our utmost care to prevent the addition of this to other troubles with which we are, in the meantime, apparently threatened. It is hoped, however, that American communities will have the wisdom to permit such measures as may effectually prevent the entrance of the scourge among themselves. If there is amongst us sufficient wisdom, there is sufficient knowledge to justify this hope.

Not so with the next scourge upon which we have to comment from year to year. Diphtheria is ever with us. Its bacillus wheresoever it may have acquired its original life, has seemingly succeeded in asserting itself as autochthonous. It appears everywhere and at all seasons, and if allowed favorable conditions is as malignant and distressing as ever. When we consider the cruelty of its symptoms, and the helpless dependence on parental oversight of the greater number of its subjects, we cannot but wonder at the unconcern with which communities so often regard its prevalence. The Board has lately had an example of this indifference to duty, and heedlessness of infant life on the part of a municipality situated northward, into which a "sore throat" had found its way and was being attended with much mischief. Deaths of children took place, several in a family as is the frequent rule in diphtheria epidemics, and were lamented with a certain resignation by parents and health officials; but nothing might have been heard of this beyond the limits of the township had it not been for the delivery to one of the families of the physician's bill. Following this there was a rising of interest of a very lively nature, which culminated in an appeal to this Board. Your committee, which was dispatched to make enquiry into the cause of complaint, giving its attention to the prevalence of the malady, found that the whole evil was due to the complainant, the means of prevention having been wholly overlooked by the sanitary officials; the very first steps recommended to them for the purpose of arresting infectious diseases having been wholly neglected on the part of all.

It seems in place here to say that for all such fatalities as have been adverted to, this Board can justly hold itself free from all responsibility, whether these may have resulted from mistakes on the part of physicians, or from neglect of sanitary precautions on the part of the proper authorities. Among the transactions of the Provincial Board of Health, necessary measures of prevention have been, on many occasions, discussed. Last January there was a very full report by the committee on epidemics, which had reference to diphtheria especially, and which, had physicians and municipal authorities read, they would have found something to their advantage. They would have, in some instances, been saved from needless loss, humiliation, and reproach.

The Board will remember that the secretary, at its last meeting, informed us that many phials of anti-toxine had been forwarded to infected districts, and that most favorable reports of its usefulness had been received from parties who had employed it. These reports we may hope to see scrutinized and compared *with those from other sources*, so that we may aid in the arrival at a correct and



reliable conclusion as to the endeavors thus put forth to lessen the various destructive results of this malady. There is still much discrepancy apparent among those who have had opportunities of witnessing or of performing anti-toxine injections. It becomes us patiently to wait until experience has become more uniform; in the meantime reflecting that even following so simple an operation as a hypodermic injection, there is a possibility of error, even in the detail of manipulation, and great room for differences of opinion in the estimating of the results.

Of typhoid fever we have heard comparatively little during the past year. We have not been free from it, but it has been neither so general as in other periods of its history; nor has its mortality been so great in proportion to such prevalence as it has had. If we take its prevalence in Hamilton as an example of its frequency elsewhere, we may safely say that we have not suffered much from typhoid. In a population of nearly, if not quite, 50,000, there were, during the year, ninety-six cases, and among those there occurred seven deaths, three of them taking place among the thirty-one people who suffered from the disease in October, and one in the seventeen cases which occurred in September, and three in March, being all the cases occurring in that month.

Hamilton is a well sewered city, but its sewage, once it gets beyond the city bounds, is not well disposed of, and there are not wanting those who say that some of it comes back again, while it appears that others, having conceptions of bacteriology of the nature of polymorphism, are of the opinion that the typhoid bacillus being so very like an ordinary water bacterium, may have become pathogenic and productive of typhoid as a result of its cultivation in a medium favorable to the evolution in it of that character. That, no doubt, is a very tempting and plausible theory, and it appears to obtain some strength and authority from the discussions of the experts in the science of bacteriology, as well as from a consideration of the simplicity of the structure of those very low organisms, which may be regarded as the first appearance of vitalized from unvitalized matter, the first step in evolution, so to speak. The experts do not look at all favorably on such scientific conclusions, and that on the part of unlearned people. In forming them, no doubt, the *profanum vulgus* is taking too much upon itself, and if induced by them to look upon typhoid and perhaps other troubles as unavoidable, so long as men drink water, it will do itself great harm, and will come to regard profound scientists with less respect than may be their due. The ignorant and simple, above all others have a right to question; and when they are told that certain bacilli are always found in water, even in great bodies of it, and that they come into it from the intestines of men and animals, they ask, in their own dull way, "Is it not possible that those organisms reach the intestines in the first place from the water, where, in one form or another, they have been primordially?"

Such reflections as these revolve themselves hazily in the minds of those who for the greater part pay the taxes, and thus have the claim to vote, and who have for some generations now been educated in the doctrines of evolution. Unless the labors of the experts prove, in their results, more definite than they have as yet, they whose enlightenment they seek, but who are already the victims of the tax gatherer, will rather join in the jeers so often directed against their scientific benefactors, than regard the difficulty of their work or the excellence of their aims. The people will be unwilling to incur increased cost for what, so far, seems to them of questionable necessity. We have to wait until the experts in bacteriology give us a sure description of the various forms



of bacterial life, that is to say until perfecting their science, they can show without question that those organisms, like others of higher kinds, can be divided into their orders, genera, species, and varieties.

When that consummation shall have been attained, and our minute destroyers are clearly exposed to our conception—their habits known—means may suggest themselves as being within the reach of our burdened communities, whereby they shall be able to provide effectually for their escape from many distressing visitations.

At the same time, while we may sympathize with municipalities which find it too burdensome to provide against the invasion of disease, we may remember that in a great many instances, their straitened circumstances are due to the dissipation of their means and the injury of their credit, by their expensive encouragement of business schemes, the promoters of which should be permitted to find their own capital, but by which these promoters, by certain judicious proceedings, succeed in showing that great benefits are likely to accrue, especially to all who are not concerned.

During the past year the Board has again had its attention drawn to the subject of tuberculosis. In the year preceding a strong hope had been entertained that science had bestowed upon us another signal service, and that a successful advance had been made towards the attainment of immunity from the results of tubercular infection. Now, however, that prospect is clouded. The hope is for the present at least abandoned, and therefore preventive medicine turns to dealing with this the cause of so much trouble and distress, in the manner which, so far, is alone known to be effective in hindering the progress of *all* infectious disease.

This Board accordingly has been giving its attention to impressing upon the community, and upon those in authority in Ontario, that if the evils resulting from tuberculosis are to be lightened, that most desirable end can be best and most surely reached by the withdrawal of those who are suffering from the infection of tubercle from association with those who are as yet in a state of health; and that this separation is as serviceable in securing increased comfort and prolonged life in the former, as it is essential in securing the escape from deadly infection in the case of the latter.

So anxious has the Board been on this subject that it has joined a number of benevolent gentlemen, and physicians of Toronto to bring this, as a great social need, under the notice of the Provincial administration. The application then made by those worthy gentlemen was clearly shown to be beyond the function of the administration, and so it failed. But the object was good, and it is one not to be dropped, but to be pursued in a more practicable way.

The difficulties in dealing with tuberculosis by segregation have already been the subject of remark before the members of the Board, but the opportunity may be taken now, further to allude to what in this affection are the peculiar obstacles to the course which, it is believed, we all recommend. These are found in the universality of the disease, and in the almost limitless degrees which mark its progress in different constitutions, and even in the same constitutions at different times, and under different conditions. All classes are its victims and there is no respect of persons in its behaviour towards any. Life in some instances is destroyed with a rapidity characteristic of affections which are acute and malignant, while in others the symptoms of disease are intermittent, and protracted for a long time, a losing battle being maintained against it, with occasional intervals of apparent truce for many years, its victims yielding at last only when old age

coming to the aid of the destroyer, the power of resistance fails, and the struggle comes more quickly to an end. Between those extremes there is every degree of virulence. In examples of the latter kind, from their long continuance, the risk of propagation by infection is necessarily greater than in those of shorter duration and yet those are they in which the desired separation is most difficult to be brought about.

In the more acute forms it may often be possible to obtain from patients and from relatives a compliance with the advice that they should avail themselves of the accommodation of a "Home" or a "Hospital." But it must be expected that difficulty will be met with in persuading the population in general that those who have the symptoms of the more prolonged disease and who may be, nay so often are, family bread-winners, can ever become residents in such institutions in any great numbers.

At the same time none can well deny that it is the duty of preventive medicine as much as possible to attempt, in its own way, the mitigation of the evils of tubercular infection, and that having this end in view it is justified in insisting in the face of all controversy that there are benefits to follow the removal from among the healthy of those affected with any form of tuberculosis, those with phthisis especially, and for the purpose of effecting this removal, in striving to impress upon both public bodies and individuals the necessity for places of retreat for those who are sufferers from this malady.

It may come within the sphere of the duty of the Board to give consideration to the modes by which there may seem the greatest probability that such Homes may be placed where they may be of most service within our own Province of Ontario. It is not unlikely that we may be asked if we have counted the cost which is involved in what we assert is a necessity, and also if we have considered fully, and can in any wise show satisfactorily, the apportionment of the general relief which may result from the adoption of our proposal. This perhaps is not our function, but it would be a great gain if we could deal satisfactorily with these questions, although perhaps they cannot be answered except by the light of experience. In the meantime it seems to be evident that tuberculosis, being of universal prevalence, sparing neither rich nor poor—not the one more than the other—the procuring of such refuges as are proposed, for the numbers who need them, will appear to be such a heavy financial responsibility that few of our public bodies, provincial or municipal will venture to undertake it, especially when we reflect that those who in the greatest numbers need them are just the classes who can least afford to enjoy the benefits of them.

Here, however, it is encouraging to note the rise and increase of private hospitals in our own country as well as in others, and there is little doubt that those will more greatly increase. Pointing to these as an example we may hope to bring about on similar principles the creation, first of one here, and then another there, of "Homes for Consumptives." And it seems that efforts on the part of sanitary institutions and associations will be most usefully directed, which aim to influence general opinion on favored retreats for consumptives brought into existence in a similar way, some as private ventures and others as the fruits of a spirit of benevolence, the former for the well-to-do, the latter for the less fortunate amongst us.

As yet it cannot be said that we have the full countenance of the medical profession to our advocacy of those "Homes or Hospitals" for consumptives exclusively. Nor need we expect that aid if our endeavors shall be to provide a number of Governmental institutions with government officials in charge of them.

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If such Homes are to be useful (while of course they are subject to Government inspections), they must have perfect freedom in their several modes of administration, and from none of them should the physician of the patient's choice be excluded. The conversion of medical men to the scheme of such Homes is essential to its success. Their interest as well as their professional zeal must be enlisted in its favor.

In fine the efforts of sanitarians should chiefly be to impress the minds of all with the fact that tuberculosis is the result of direct infection, and exorcise the hitherto fixed and universal persuasion that its origin is always hereditary. Once let the conviction prevail that consumption is truly and always the result of its own peculiar infection from without. Let the mode of its infection be generally understood; then the constant pressure of its presence will, sooner or later, impel society to the adoption of this means for protecting itself, and of affording comfort and some prospect of prolonged health and life to those of its members who are sufferers from this the most prevalent of all the evils which distress it.

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## QUARTERLY REPORT OF THE COMMITTEE ON EPIDEMICS.

TORONTO, November 3rd, 1895.

*To the Members of the Provincial Board of Health :*

GENTLEMEN,—Your committee begs to report on the public health for the past quarter since November.

The Province continues to be free from smallpox; no case having been reported during the quarter.

Reports from Michigan continue to state the presence of smallpox in Detroit, where it has been continuing for the last twenty months; cases are reported from Indiana, Wisconsin and one or two other neighboring states, it being epidemic in Texas and Tennessee.

One case was reported January 28th by the Quebec Provincial Board as being present in Missiquoi county. It was without doubt traceable to infected clothing from the United States. No further cases are reported from this district.

Typhoid fever, when prevalent in the autumn, has almost disappeared, there having been but few cases in Toronto or Brantford, whence recent reports have been received.

The action taken by the members of the Local Board of Health of Brantford is much to be commended; action having been taken to close some 108 wells reported dangerous.

Scarlatina has been found in several places as localized outbreaks. It broke out in the Barnardo Home at Peterborough, some eight cases having occurred up to November 22nd.

From the reports received it is gratifying to state that there has been no part of the Province where diphtheria has shown the same malignancy, or epidemic character that it did in the same period of 1894-95. That it has been present, however, is seen in the several reports herewith presented as in the Algoma district, Sturgeon Falls, Arnprior, Renfrew, Chesterville district, Dundas county, lumber camps in Hardy township, Muskoka, Dunchurch and Magneta-wan districts, Carp district, Renfrew county, Manitowaning district in Manitoulin, etc., etc.

In addition to these districts, there have been orders for anti-toxin since September 1st from twenty-nine municipalities in nineteen counties to the amount of 125 bottles or \$300.

Kent .....	2	Oxford .....	1
Simcoe .....	3	Lambton .....	1
York .....	39	Waterloo .....	2
Frontenac .....	2	Wentworth .....	2
Leeds .....	3	Huron .....	3
Prince Edward .....	1	Brant .....	1
Perth .....	1	Dundas .....	1
Wellington .....	1	Middlesex .....	1
Muskoka .....	2	Bruce .....	1
Lincoln .....	1		

As compared with this, it may be stated that anti-toxin was ordered in the three winter months of 1894-95 to the extent of 300 bottles or \$675 worth.

The distribution of the anti-toxin may or may not indicate the prevalence of diphtheria in any district as its use must be considered as yet but partial. But it may be stated as a general fact that those who have used it once are those who use it a second time, in cases apparently likely to be serious.

The report for the similar quarter in 1894-95 gave seventy-five municipalities reporting the presence of the disease, in many cases as serious epidemics.

Whether owing to the general increasing accuracy of early diagnosis on the part of the profession or the increasing knowledge on the part of the public of the dangers of infection from diphtheria, we have to note the agreeable fact that the disease shows everywhere apparently a notably less prevalence and virulence than a year ago.

As will be seen in the report of Mr. Mackenzie, a more frequent advantage continues to be taken of the laboratory in the matter of diagnosis.

Arrangements are being made for still further facilitating the forwarding of specimens from the rural districts to the laboratory for examination. The great satisfaction obtained from positive knowledge as to the character of the exudation, on the part of the physicians who have taken advantage of these facilities, can hardly be comprehended except by those who have to treat cases; while the positive support it gives to the Medical Health Officer in maintaining isolation and keeping those infected from school, can only be understood by those who have known the serious disputes regarding cases in former years. In any cases of dispute some medical officers now regularly make use of the laboratory to determine the diagnosis. The practice has, we understand, become positive and regular in Toronto for the city officer to allow no child to return to school till a culture from the throat prove freedom from the disease.

A year has gone since the use of anti-toxin has become general. Its gradually increasing use is seen in the fact that while in Toronto a year ago only ten medical men purchased a supply from the Board of nineteen bottles to a total of 300 bottles sold; the last quarter's sales show seventeen physicians purchased thirty-eight out of 125 bottles used in the city, where there have been comparatively few cases of the disease.

The remarkable value of anti-toxin in diphtheria has long since passed the experimental stage, and all foreign statistics give unqualified testimony as to its value.

In the extended paper of Prof. Welsh, of Johns Hopkins University, nothing can be more conclusive than the figures there quoted; while the latest statistics of Dr. Monod, of Paris, state that in 106 towns of over 20,000 population each, the deaths in the first half year of 1895, as compared with the average from five previous years shows a reduction of sixty-six per cent. It would appear most unfortunate that there should exist longer any hesitation on the part of any physician, or medical officer of health, to take the fullest advantage of this result of modern biological research, while in the eyes of those who have studied most wisely it must be placed on the same plane as Jenner's discovery of vaccination. The Paris Academy of Science awarded, in December last, the prize for the most valuable discovery of recent years, equally to Behring, of Germany, for its discovery, and to Roux, of Paris, for the fuller development of the utility of anti-toxin in the treatment of the disease.

(Sgd.) C. W. COVERNTON,  
J. J. CASSIDY,  
PETER H. BRYCE.

# REPORT ON A CASE OF RABIES IN EKFRID TOWNSHIP.

BY J. J. MACKENZIE.

LABORATORY OF THE PROVINCIAL BOARD OF HEALTH,  
TORONTO, April 4th, 1895.

*To the Chairman and Members of the Provincial Board of Health of Ontario :*

GENTLEMEN,—I received from Dr. McEwen, of Melbourne, on Tuesday, March 19th, a box containing a portion of the skull and brain of a dog supposed to have been rabid, a full account of which is given in the correspondence.

Immediately on the receipt of it, I took a small quantity of the medulla oblongata, triturated in a sterile mortar with sterile beef broth and injected it underneath the dura mater of two rabbits. Rabbit No. 1 received about one-half cubic centimetre of the mixture injected far back over the cerebellum; rabbit No. 2 received about one-tenth cubic centimetre on the surface of the cerebrum. The following day I treated a third rabbit in the same manner. The morning following the operation the rabbits were quite well and the wounds healed rapidly by first intention.

The following is a table of the temperatures and weights of the animals from day to day :

	Rabbit No. 1.		Rabbit No. 2.		Rabbit No. 3.	
	Weight.	Tempera- ture.	Weight.	Tempera- ture.	Weight.	Tempera- ture.
	gr.		gr.		gr.	
March 19.....	1,170		790			
" 20.....					729	
" 21.....		99.4		98.5		99.8
" 22.....		102.8		100.6		100.8
" 23.....	1,136	100.8	774	97.8	731	100.5
" 24.....		103.2		102.4		101.8
" 25.....		103.8		100.3		101.4
" 26.....	1,065	102.0	823	100.4	766	98.6
" 27.....		102.0		102.0		102.5
" 28.....	994	100.5	788	99.3	731	101.2
" 29.....	930	94.2*	759	100.4	816	102.2
" 30.....		86.0	731	99.5	752	102.3
" 31.....	852	91.0	702	97.8	730	102.6
April 1.....	still	alive.	695	97.4	809	103.
" 2.....	de	ad.	624	94.8	823	101.

Rabbit No. 1 died April 1st, rabbit No. 2 April 2nd. In the case of No. 1, the animal did not at first show paralysis, but rather great weakness. In the case of No. 2, the animal showed paralysis (complete) of the right hind leg and partial paralysis with hyperæsthesia of the left hind leg.

The postmortem results were practically the same in both animals, intense congestion of the whole central nervous system, but especially so of the spinal cord.

The incubation period is rather short for the first passage of street rabies in the case of rabbit No. 1, but that may be accounted for by the exceedingly large dose which he received. In rabbit No. 2 the period of incubation (fourteen days),



was about the average length of time for the first passage. Rabbit No. 3 is still living and has shown as yet no symptoms; to-day is the fourteenth day for it. To be absolutely certain, of course, it is necessary to pass the virus on through other rabbits. I propose doing this.

I think, however, that there is little doubt that the animal died of paralytic rabies.

I have the honor to be

Your obedient servant,

JOHN J. MACKENZIE.

(This letter is explanatory of the outbreak.)

[Copy.]

APPIN, ONT., March 17th, 1895.

DR. P. H. BRYCE,

Secretary Provincial Board of Health,  
Toronto, Ont.

DEAR SIR,—Dr. McEwen, of Melbourne, will express you in a sterilized vessel and securely packed, the posterior portion of head and neck of a dog supposed to be rabid. I am not certainly aware that your laboratory has facilities for examining such a case bacteriologically, but send in the hope that you have. If so please demonstrate nature of bacteria present in this case (head has been frozen since 12th instant until packed), and if hydrophobia germs can be found let us know as soon as possible. If inoculation experiments are necessary please send word as to microscopic appearance of a section. Perhaps this should properly have been sent to Mr. Mackenzie, but the closing part of this will show why I send to you. Dr. McEwen may also address head to you, in which case please hand to Mr. Mackenzie.

The dog bit a young lad (say 17 years) on the backs of both hands, through a rather thin pair of woollen mitts, on Wednesday, the 6th instant. The dog at that time was not supposed to be rabid and had previously been a fairly even-tempered dog, but on the same night it left home, after making some attempt to bite its owner, and "took in" a circle of country of about ten or more miles, biting nearly every dog in its course and also farm and domestic animals and fowls. It attacked two or three people (as far as heard from) biting only one and that did not penetrate skin on account of a heavy glove, and it did not return home until Sunday, 10th inst., about 2 p.m.

On return it did not attempt to bite its owner or any of family. It was evidently sick and stupid, would not answer when called, eyes sunken and glassy, much emaciated, owner offered it bread and milk but would not touch them, a piece of meat placed in the mouth was immediately rejected with evident pain, did not bark or growl, prostrated somewhat, which increased, and on Monday night or Tuesday could only rise on front legs, hind parts being evidently paralysed, some convulsive attacks noticed but not severe, dog then killed.

In its course through country it passed through a village and bit every dog in sight. It would run from one group of dogs to another, biting and snapping and not stopping to fight. Other dogs, on its approach, would run away from it, although some of them had the reputation of being good and eager fighters.

I did not mention that saliva was scanty and thick and ropy when seen at home on Sunday and Monday.

In my opinion all clinical symptoms denote rabies, but would not affirm such without a laboratory examination.

The township council has been asked to defray expense of sending bitten lad to New York Pasteur Institute for treatment. Dr. Gibier telegraphs me that cost for minimum period of treatment of fifteen days will be \$200 and board \$50. Have requested of him if any reduction cannot be made. Boy's parents unable to pay anything towards cost as I am informed they are very poor, barely making a living for themselves.

Our Council wishes to know from you if Provincial Board will bear any of cost in case they decide to send him. They do not wish to incur expense unless they are reasonably sure of dog having hydrophobia and not some simulating disease.

In case you cannot examine parts sent, please wire on receipt—what proportion of cost Board will pay, if any, and oblige.

Yours sincerely,

(Sgd.) L. HYTTENRAUCH, M.D.

P.S.—Also, has local Board of Health power in this matter.

L. H.

## REPORT OF THE COMMITTEE ON EPIDEMICS ON A HOME FOR CONSUMPTIVES.

*To the Chairman and Members of the Provincial Board of Health :*

TORONTO, January 17th, 1895.

GENTLEMEN,—Your committee has for several years reported on the problem of how to lessen the great death rate from tuberculosis in Ontario, and presented at the last quarterly meeting, proposed regulations for placing tuberculosis on the list of notifiable diseases.

The more, however, that the problem is studied, the greater the urgency seems to be, for the establishment as a corollary to such compulsory notification of a Home for consumptives on some inland and elevated tract of warm and dry soil protected by an evergreen forest growth, and conducted under conditions which have been found most successful wherever such sanatoria have been established.

It would further seem to your committee that such provision can only be realized in the near future by its establishment being undertaken by the Government, and that thereafter, when it has gained public recognition, the counties might be encouraged to establish in favorable localities similar Homes, modelled on that erected by the Government.

Such a Home would necessarily be something between an hospital and a sanatorium, the maintenance of which might be in considerable part provided for by the products of agricultural, horticultural and other industries, and by the moneys received from pay patients of the better class.

The arguments for the establishment of such an institution may be briefly summed up as follows :

1. That according to the Hospital Report for 1892 one patient of every twenty amongst the 11,008 inmates of the General Hospitals of the Province were tuberculosis; while almost as many more, or 4.5 per cent., suffered from acute bronchitis or pneumonia, a considerable proportion of whom, according to medical experience, are likely to have subsequently developed consumption.

2. That the amount of Government aid to the hospitals in 1892 for the maintenance of this number of 1,197 patients was at the rate of, say thirty cents per diem, \$359.10, which if the number were maintained for the whole year would have amounted to \$131,071.50.

3. That the General Hospitals in the different cities of the Province have not in any single instance, as far as I am aware, any method, as by separate wards, for preventing these consumptives (one in every twenty) from mingling with patients suffering from acute and exhausting diseases, which render them especially liable to inoculation with tuberculosis.

4. That with 750 deaths in the twelve cities of the Province during 1892 from tuberculosis, and probably as many more persons suffering from the disease, there was as a result a notable danger of such persons spreading the disease not only within their own families, but also amongst their fellow-workmen and workwomen so long as they were able to perform labor, forced upon them by their limited means.

Other arguments put in a more general way have been presented in the Report on Tuberculosis prepared by your Secretary and published by the Board last year, as well as in articles read before the Association of Executive Health Officers in August last and published in that report.

Proposals to establish an hospital for consumptives in Toronto have, as you are aware, been made, but so far the idea has taken no definite shape.

However valuable such an institution if established will become, it cannot as an hospital fulfil the conditions which must recommend themselves to your committee. As is well known the lakeside cities and even rural municipalities bordering on our great lakes have an incidence of deaths from consumption notably greater than the inland and more elevated counties. The following table, published before in previous papers, may be repeated, and year after year may be illustrated.

Deaths from Tuberculosis in cities in 1891, 1892, 1893, in Ontario.

Cities.	1891, ratio per 1,000 of population.	1892, ratio per 1,000 of population.	1893, ratio per 1,000 of population.
Toronto .....	2.4	2.5	2.6
Windsor .....	2.7	1.2	1.6
Kingston .....	2.2	2.1	1.8
Hamilton .....	1.8	1.5	1.7
Brantford .....	1.7	2.0	2.4
London .....	1.6	1.3	1.3
Belleville .....	1.4	2.9	1.7
St. Thomas .....	1.4	1.2	.9
St. Catharines .....	1.3	2.9	1.9
Ottawa .....	1.2	1.8	2.4
Guelph .....	.9	1.5	2.1
Stratford ...	.8	.9	1.1

It seems, therefore, apparent that the location of such a Home of a provincial character must be chosen with a view to the very best location from the climatic and geological standpoint.

It has been stated elsewhere that basing the calculation on the annual death rate probably a number approaching 5,000 consumptives are at any one time living within the Province. If it were assumed that even a number equal to those treated at present in hospitals for tuberculosis and other pulmonary complaints were provided for gradually, it would mean an institution not larger than one of the Provincial Institutions for the Insane at the present time.

Without going further, however, into the question, your committee believes the time has arrived when the demand for such an institution is general.

It commends itself to the Inspectors of the Department of Public Institutions both from the public health and economic standpoints; and your committee would therefore recommend the adoption of the report with instructions to have it forwarded to the proper authorities for consideration.

This is all the more urgent in view of the fact that your committee has not been informed of the making of the Order-in-Council *re* Compulsory Notification of Consumption; while your committee may further state that the point was raised in the discussion of the regulations with the Government, that if the consumptives were prevented from engaging in employment in workrooms and factories where mingling with others was necessary, what other disposition of them was at present possible?

All of which is respectfully submitted,

C. W. COVERNTON,  
P. H. BRYCE,  
Committee.



INTERIM REPORT ON THE OUTBREAK OF TYPHOID FEVER IN  
BRANTFORD.

*To the Chairman and Members of the Local Board of Health, Brantford :*

GENTLEMEN,—Having learned of the prevalence of fever in Brantford, and having had forwarded samples of city water for analysis, with the information that its purity was being questioned by some people, on the authority of one or more prominent physicians, I have taken the earliest opportunity of investigating the matter with the object of determining, if possible, the principal causes of the outbreak.

I have to thank the several city officials for their courtesy and energy in collecting and collating the large number of details which are summarized in the tables hereto attached, and which will be herein referred to for reference.

*Causes.*—Typhoid or more properly *enteric fever* (because the effects of the disease are specially located in the intestines) is now known to be caused by a specific germ (or minute organism allied to the fungoid family) which multiplies in the intestines and thence in the blood, and in probably all cases reaches the blood by way of the digestive tract either in drink or on food, or if inhaled. It is carried thence from the mouth and posterior air passages on food or in drink. Though not readily multiplying outside the body, the germ undoubtedly at a temperature above 60° F. seems capable of multiplying in organic matter, and notably in the water of wells, where not exposed to the free action of fresh air and sunlight. Hence shallow wells whose temperature rises in the summer, and which become impure from the soakage through sandy soils, of organic pollution, notably from privies, stables, etc., are polluted by the two sources from which typhoid practically always emanates except when the same materials get into the public drinking water from the sewage of towns. I find by reference to the reports of the past five years that the total cases of typhoid, and especially the total deaths therefrom, in Brantford have been very notably less than in the period prior to the general use of city water.

As the total services are 1,790 (with the factories excluded); it may roughly be calculated that 9,000 persons regularly use city water, or some three-fifths of the total population.

After several years of relative immunity with an annually increasing number of water-takers, it was perhaps natural that many should conclude that the notable prevalence of typhoid during the past three months in Brantford ought to be considered as due to the common source of drinking supply. Such, however, have not known or not considered, that while the conditions of public water supply have not altered from several preceding years, those peculiar to well water have.

Thus the temperature of—

May exceeded the average of forty years by.....	3.2° F.
June " " " .....	5.6° F.
July was below " " .....	1.3° F.
August " " " .....	0.3° F.

and with these began and continued, notably in the Brantford district, a drought unprecedented in Ontario.

Thus the rainfall—

Fell below the average in	May by	0.60 inches.
"	June "	2.21 "
"	July "	0.51 "
Exceeded	August by	0.11 "

To such conditions of unusually low ground water was added that of the greater tendency of all liquid sources of pollution in the neighborhood to soak towards the lowest point, and thus become possible by the succession of rains in August and September.

There has thus been a maximum of pollution with a minimum of dilution, with an unusually high ground water temperature. Thus at the waterworks station, the water whose normal is 52° F. was found to be 65° F. or greater by 7° F. than in 1893, when I tested it. The temperature of other ground waters will have risen relatively to the amount used and to the depths of wells.

That the city water is the same water it has ever been is seen in the sub-joined chemical analysis of 1893 and 1895.

That it is practically a sterile or filtered water is seen in the following table of comprehensive bacteriological tests made on September 21st, 1895:

Bacteriological test made on September 21st, 1895.

Sources of several samples.	Amount of water taken.	No. of colonies (i e., No. of bacteria at time samples were taken.)	Notes.
1. Tap in engine house . . . . .	1 c. c.	16	A few gas-producing forms.
2. Old creek reservoir . . . . .	1 c. c.	320	
3. Canal . . . . .	1 c. c.	270	
4. Old well, 50 feet from privy . . . . .	1 c. c.	2,052	
5. Driven well at greenhouse, 20 ft. from manure heap and 60 ft. from privy . . . . .	1 c. c.	307	

That it differs much more from polluted wells, communicating with the surface, even as a driven well is seen in the above table, and what ought to have been remembered by those using town water, is that the river water relative to local pollution is infinitely more diluted than a pit well with sunlight excluded and subject to constant local contamination. These differences are shown in the table.

The freedom from suspicion of city water is, however, capable of demonstration by other than mere chemical figures. If Ward III. be taken for illustration in the tables, it will be seen that the density of population there is  $2\frac{1}{2}$  times as great as in the next two highest, viz., Wards II. and V., and four times as great as in I. and IV.

But more than this, the soil pollution of III. is that of some 60 years, while much of the other territory has only been recently occupied.

Naturally, therefore, whatever wells still remain in Ward III. are peculiarly dangerous owing to this factor of progressive soil pollution; for while ash closets largely exist, soak-pits are not yet all abolished nor the earth of old ones all renewed. There cannot, however, be many wells used, although existing unfilled; but that some have been re-opened this summer for cooler water is beyond question. This has, unfortunately, been greater owing to the suspicion which seems to have attached to the city water. That their total is, however, small, is positively proven by the fact that there are in Ward III., with a population of 3,457, some 693 consumers, or one taker for every household of five persons. It naturally follows therefrom, that if with relatively few drinkers of



well water twenty-one cases occurred where wells only were used and one case with both wells and city supply, and if with practically 3,457 persons to whom city water was available, there were but twenty cases in houses where it alone was used, we must unquestionably conclude that the well water is exceedingly dangerous and that well water accidentally drunk, filthy cellars or privies, or some other specific cause, must be held accountable for cases in houses where city water is usually used.

It may, however, be urged that in Ward II., where the population is only 9.8 to the acre, where the lots are large and the premises cleanly, and the city water takers are as one to seven and a half persons, that there ought to have been a natural absence of cases if the city water had not been a factor. We there find, however, that the cases are almost equally divided between premises with city water (31) and those with the well water (34). Now assuming that the wells are in such a soil largely free from pollution, and that ash closets generally prevail and that the city water is not the cause in those houses where it is introduced, and that many wells are free from suspicion, we are left to the alternative of the only other probable source, viz., the milk supply. Now what we do find is that one particular milk is associated with twenty out of seventy-four cases of typhoid which have occurred in Ward II., and that the balance are distributed amongst thirteen other milk vendors. In other words, one milk vendor supplying 119 families has typhoid occurring in twenty of these while thirteen others supplying 1,094 families have fifty-four cases distributed amongst them, and of these fifty-four, six are associated with one other milk vendor.

This argument receives additional force from the fact that of the total families supplied by the first mentioned milk vendor, distributed over other wards, twenty-one per cent. have had cases of typhoid, and of the last mentioned vendor, with families in one ward only, some fifty per cent. of all have a case of typhoid.

That these two supplies stand in a very different category from all the others, is seen from the fact that with many other dealers with as many families none have higher than seven per cent. of cases, and an average of four per cent.

If, however, further evidence as to the unwarranted suspicion which has attached to the city water is required, it may be found in the progressive character of the cases in the matter of time.

Water-epidemics (*i.e.*, from public water supplies) have invariably been of an explosive character. Thus in six weeks in 1887, 1,600 cases occurred in the city of Ottawa, most of these, indeed, within three weeks.

In the present outbreak, as seen in the tables, the disease has progressed gradually and has kept time with the period of increased rain fall after the drought.

#### *Recommendations.*

These are apparent from the facts tabulated, and are deductions drawn from them.

1st. Reduce the cost of city water to the smallest point consonant with the demands for revenue.

2nd. Order the closure and filling up of every well in Ward III. before next June, and immediately of all wells associated with typhoid, or which in the opinion of the medical health officer and engineer are situated so as likely to become dangerous.



3rd. Have an immediate and special examination made of every dairy, and especially of the source of water supply, both for cattle and for the cleansing of milk vessels.

4th. Withdraw the permits of all whose water supplies are from wells so situated as to be liable to contamination, until a new well has been driven or dug in such position as is approved by the medical health officer and by the engineer.

5th. Require compliance with the Act regarding notification by physicians and householders, since had notification been made, early and regularly, the prevalence of the disease to its present extent would not have been possible, and the suspicion attaching to the public water supply, by an early investigation of the local conditions where cases had occurred, would not have resulted.

I have the honor to be,

Your obedient servant,

P. H. BRYCE,  
Secretary.

TABLE I.

TABLE SHOWING CASES OF TYPHOID FEVER IN BRANTFORD.

Total cases supplied with city water.....	58
“ “ well water.....	100
“ unknown supply.....	9
“ with both supplies.....	7
Total cases.....	167

TABLE II.

TOTAL CASES BY TEN DAY PERIODS BEGINNING WITH JULY 1ST, AS PER REPORTS OF PHYSICIANS.

From July 1st to 10th, inclusive.....	2 (includes 1 from June).
“ July 10th to 20th, “.....	4
“ July 20th to 31st, “.....	13
“ Aug. 1st to 10th, “.....	17
“ Aug. 10th to 20th, “.....	8
“ Aug. 20th to 31st, “.....	22
“ Sept. 1st to 10th, “.....	38
“ Sept. 10th to 20th, “.....	30
“ Sept. 21st to 23rd, (3 days).....	4
Unknown date.....	3

TABLE III.

REPORT OF THE OUTBREAK OF TYPHOID IN BRANTFORD.

Ward 1.

Area, 600 acres.	Population per acre, 5.5 persons.
Population 3,349.....	c, 4..
Cases 16.....	w, 11.....
City water consumers 305.....	Ratio of cases, 1 to 209 persons.
	City, 25 %
	Wells, 75 %
	Ratio 1 to 10 persons.

*Ward 2.*

Area, 340 acres.		Population per acre, 9.8 persons.	
Population 3,872.....	c, 31.....	Ratio of cases, 1 to 45 persons.	
Cases 74 .....	w, 34.....	City, 42 %	
	c. and w., 7.....	Wells, 46 %	
	Unknown 2 .....	Both, 9 %	
		Unknown, 3 %	
City water consumers 451.		Ratio 1 to 7½ persons.	

*Ward 3.*

Area, 162 acres.		Population per acre, 22 persons.	
Population 3,437.....	c, 20.....	Ratio of cases 1 to 82 persons.	
Cases 43 .....	w, 21.....	City, 48 %	
	Both, 1.....	Wells, 48 %	
	Unknown, 1.....	Both, 2 %	
		Unknown, 2 %	
City water consumers 693.		Ratio 1 to 5 persons.	

*Ward 4.*

Area, 453 acres.		Population per acre, 5.8 persons.	
Population 2,633.....	c, 5 .....	Ratio of cases 1 to 109 persons.	
Cases 24 .....	w, 15.....	City, 21 %	
	c. and w., 1.....	Wells, 62 %	
	Unknown, 3.....	Unknown, 13 %	
		c. and w., 4 %	
City water consumers 138.		Ratio 1 to 19 persons.	

*Ward 5.*

Area, 310 acres.		Population per acre, 9.2 (excluding Globe).	
Population 2,866.....	c, 0.....	Ratio of cases 1 in 179 persons.	
Cases 16 .....	w, 13.....	City, 00 %	
	c. and w., 2.....	Wells, 81 %	
	Unknown, 1.....	c. and w., 13 %	
		Unknown, 6 %	
City water consumers.		Ratio 1 to 14 persons.	

From the further investigations regarding the causes of the serious outbreak of fever in Brantford, made by myself and Mr. McKenzie, who executed the laboratory examination of water samples appended hereto, it is still more apparent than ever, that the city water is not only absolutely free from the taint of suspicion, as a cause of typhoid, but that the majority of wells examined, illustrate a degree of pollution such as to make them not only suspicious, but to have been the probable causes of many cases which have occurred.

It will be well, however, that the condition of the ravine on the island, where a source of supply is taken, be improved so as at all times to make it possible to maintain a reservoir of water, for extra consumption after filtering, as pure as the river supply makes possible.

This it is recommended be done in the following manner:

1. Clear out all vegetable moulds from the deepest part of the ravine for a reservoir, and close off the upper portion of the ravine which ought also to have its vegetable matter removed, and afterwards be levelled up.
2. Bring up the lower part of the ravine to a grade such as will protect against standing water.
3. Lead a tile-drain from reservoir to the outlet of the creek, and place at mouth of creek a drain with a culvert, to allow the flood waters to flow off; but also have the drain supplied with a valve to keep out the high water of the spring floods.

This drain from the reservoir will serve to maintain at all times a fresh supply of water in the reservoir, which will receive water from the canal supply.

If in addition to this supply, a reservoir be desired, it may readily be added by laying a series of sub-soil field tiles beneath the frost line to the north of canal, and further to the south of reservoir, which can be steadily supplied from the canal.

By these methods, the filter bed for these supplies will be some 600 to 800 feet from the well, and by it we may conclude the present filtration will, if possible, be made still more perfect.

All of which is respectfully submitted,

(Sgd.) PETER H. BRYCE, M.D.

#### APPENDIX TO BRANTFORD REPORT.

TORONTO, Nov. 12, 1895.

*To the Chairman and members of the Provincial Board of Health :*

GENTLEMEN,—Acting under instructions from Dr. Bryce, I proceeded on Thursday last to Brantford for the purpose of making bacteriological examination of the water supply of that city.

My results are not, as yet, complete, but I beg to submit a preliminary report upon such as I have obtained.

I examined in all fifty-one samples ; of these eleven were from various parts of the public water supply, two from the Grand River, two from the canal, one from Dead Creek, one from a creek which was used for watering the cows of one of the milk dealers, and the remainder from private wells, in connection with the majority of which there had been cases of typhoid.

In making the examination I, in all cases, made a quantitative estimate of the bacteria growing at room temperatures ; in a certain number of cases I also estimated the number growing at blood heat ; and finally I am engaged at present in a qualitative examination of all those forms which, from their appearance, are either suspicious or peculiar. This latter part of the work will take a number of days to complete.

#### *Samples from public water supply :*

No.	Date.	Description.	Bacteria per c.c. at 22° c.	Bacteria per c.c. at 36° c.	Remarks.
1	Nov. 7..	Tap in police office.....	84	5	Practically only one form developed in the plates at 37° c. This has been isolated for further study. It proved to be a form which liquified gelatine and had no significance as evidence of pollution. Over 30 per cent. of the colonies in this sample belonged to bacillus subtilis.
2	" ..	Tap in Victoria Park .....	80	12	
3	" ..	Tap at house of Mr. John Fax ....	70	7	
4	" ..	Tap at house of Mr. C. B. Heyd....	60	2	
6	" ..	Tap at water-works .....	60	7	
7	" ..	Well at engine house .....	96	none	
10	Nov. 8..	Tap at waterworks .....	252	not determined	
12	" ..	Sample from the bottom of the well at engine house.	48	"	
13	" ..	Tap at the house of Mr. Pearce....	40	"	
38	Nov. 9..	Tap at waterworks .....	226	"	
39	" ..	Sample from the bottom of well ...	164	"	



*Samples from the Grand River :*

No.	Date.	Description.	Bacteria per c. c. at 22° c.	Bacteria per c.c. at 36° c.	Remarks.
5	Nov. 7..	Canal water near waterworks ....	1,350	21	
11	Nov. 8..	Canal water near waterworks ....	1,860	not determined	
40	Nov. 9..	River at Wilk's dam.....	2,560	"	
41	" ..	River at Dockett's.....	2,000	"	
37	" ..	Dead Creek .....	3,150	"	

*Samples of well waters :*

No.	Date.	Description.	Bacteria per c.c. at 22°.	Bacteria per c.c. at 37°.	Remarks.
14	Nov. 8..	Mr. Geo. Hall's well; a driven well 14 ft. deep; sandy soil; scant supply.	190	7	
19	" ..	Mr. A. Matthew's well; a driven well over 20 ft. deep (20½ Market st.)	520	3	
21	" ..	Mrs. McCormick's well; a driven well recently deepened; supply was scanty, is now better 14 ft. deep.	7,200	21	
27	" ..	Mr. Pringle's well; a driven well, shallow in low ground; considerable fever in neighborhood.	650	not determined	
29	" ..	Mr. Dooley's, Dufferin st.; a driven well 12 ft. deep; good supply.	1,840	"	Six different species present in this water.
33	" ..	Mr. John Rayner's well; a driven well 12 ft. deep, in the old settled part of the town.	350	"	
34	" ..	Mr. Quinlan's well; a driven well 12 ft. deep, in old settled part of town.	800		
35	" ..	Well near cemetery; a driven well 13 ft. deep.	1,410	46	
49	Nov. 9..	Mr. Douglas' well; a driven well in cellar, 12 ft. deep; fever in past years.	1,040	not determined	
15	Nov. 8..	Mr. Norris' well; pit well 53 ft. deep, on Terrace Hill.	21,000	555	Eleven species present in plate at 22°c.
16	" ..	Mr. Priddle's well; pit well, 14 ft. deep; scant supply; old closets in the neighborhood.	1,200	125	

*Samples of well waters,—Continued.*

No.	Date.	Description.	Bacteria per c. c. at 22°.	Bacteria per c. c. at 37°.	Remarks.
17	" ..	Schooley's well ; pit well, 55 ft. deep, on top of Terrace Hill.	1,500	22	In plate at 22° c. four species were present.
18	" ..	Mr. Judd Buck's well ; old pit well on side of hill, 20 ft. deep ; sandy soil.	18,600	615	Ten species present in plates at 22° c., amongst them colonies of a proleus form.
20	" ..	Dr. Digby's well ; a pit well, stone and brick walls ; no history of illness ; 14 ft. deep.	710	200	The colonies in this plate at 37° c. were very small. In the plate at 22° c. only two forms were present, B. punctated and a small non-legorifying colony.
22	" ..	Windle's well ; a pit well in worst locality of town ; 12 ft. deep ; scanty supply.	40,000	1,300	
23	" ..	P. Robertson's well ; pit well 16 ft. deep ; old neighborhood.	2,840	167	Ten species present in plates at 22° cr
24	" ..	Smale's well ; pit well 14 ft. deep ; scanty supply.	over 19,000	not determined	
25	" ..	Hunt's well ; pit well over 20 ft. deep ; close to school on brow of Terrace Hill, near old pits and closets belonging to school.	5,500	97	
26	" ..	Eckert's well ; pit well 14 ft. deep ; had been cleaned out and deepened a week before taking sample.	109,200 (approximately)	784	
28	" ..	Tucker's well ; pit well 12 ft. deep ; low ground, near privy pits, bad locality.	250	not determined	
30	" ..	Well in Jackson's Row ; similar to Tucker's.	1,200	"	
31	" ..	Syke's well on Niagara st. ; pit well 14-16 ft. deep ; scanty supply.	1,760	"	Seven species present.
32	" ..	A. Wilson's well ; pit well, close to Buck's Foundry old neighborhood ; scanty supply.	12,540		
36	" ..	Herron & Johnson's well ; pit well in cellar on hill.	2,080	"	
42	Nov 9..	T. Robson's well ; pit well not less than 20 ft. deep ; very good neighborhood on Eastward Plateau.	880	40	
43	" ..	Haffey's well ; pit well 12 ft. deep ; in west Brantford.	860	270	
44	" ..	Buck's foundry well ; pit well ; supplies all the men at foundry (200) ; not a good locality.	3,700	120	
45	" ..	Richardson's well ; pit well 12 ft. deep ; locality same as last ; supplies three families.	1,550	204	

*Samples of well waters.—Concluded.*

No.	Date.	Description.	Bacteria per c. c. at 22 °.	Bacteria per c. c. at 37 °.	Remarks.
46	" ..	Patton's well ; pit well 27 ft. deep ; on Terrace Hill, houses higher up ; a milk dealer.	1,770	not determined	
50	" ..	Wallace's well ; pit well 12 ft. deep.	3,150	"	
51	" ..	Well at Mohawk Park ; 12 ft. deep ; new well ; abundant supply ; isolated.	1,600	"	
47	" ..	Patton's creek, 200 yards from hog- pens, which drain into it ; cattle sometimes watered here.	over 40,0000	"	

**REPORT OF COMMITTEE ON EPIDEMICS *RE* DIPHTHERIA IN  
PROTON TOWNSHIP.**

*To the Chairman and Members of the Provincial Board of Health :*

GENTLEMEN,—Your Committee on Epidemics having met on the 24th August inst., learned from the reading of correspondence between Dr. Bryce and the local Board of Health of the township of Proton, in the county of Grey, that a serious disease of the throat had caused five deaths in the family of Mr. John McLuhan, and also that conflicting opinions were expressed as to the nature of the disease.

After consultation the Committee deemed it wise to hold an investigation, and a letter was sent by your secretary to Mr. James Cavanagh, secretary of the local board of health of Proton, informing him that a Committee of your Board would sit at Dundalk, county of Grey, at 2 p.m., August 28th, to make the necessary investigation, and further requiring him to see that the necessary witnesses should be notified to attend.

Dr. Bryce being unable to leave town on that day, a Committee, consisting of your chairman, Dr. J. D. Macdonald, and Dr. Cassidy, a member of your Committee on Epidemics, went to Dundalk and opened the enquiry in the parlor of the McCulloch House in that village at 2 p.m., August 28th. The secretary of the local board of health of Proton, Mr. Cavanagh, acted as clerk and wrote down the evidence. The witnesses were sworn and questioned by your Committee as to their knowledge of the matter at issue. The history of the disease, and also the condition of sanitary matters in Proton :—In order to elicit the important facts as completely as possible, the enquiry was conducted along certain lines, which had been pre-determined by the Committee. Sub-joined is the evidence :



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EVIDENCE.

John McLuhan, farmer, of the township of Proton, being sworn, deposed as follows: I do not remember the date on which the first illness took place in the family—none of the family had been from home during a fortnight.

William had been at a raising for an afternoon, four days previous to his illness.

I do not know of my own knowledge of cases of diphtheria having occurred in the neighborhood—my son told me he had been in company with and had drank water from the same cup with a companion who had a sore throat, four days before he got ill—the disease appeared to be common sore throat, the doctor's opinion was at first it was not contagious; the young man, William, was going up and down amongst the family—my son called on the physician two days after his throat became sore—no instructions were given by the physician as to isolation. My wife and I nursed the sick patients; we were not isolated from the other members of the family.

(Sgd.) JOHN MC LUHAN.

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Mary McLuhan, wife of John McLuhan, being sworn, deposed as follows: The disease was not thought serious at first; having heard the testimony of my husband, I agree therewith. My son Henry lived eight days after the disease commenced; he died on the 8th day of July, 1895. Robert died on 14th July, 1895, having been ill one week. Luella died on 14th July, 1895, having been ill five days. Annie Louisa died on the 28th July, after an illness of ten days. Eddie died on the 6th August, after an illness of five weeks. I consider that the disease was serious, never having seen that kind of sore throat before.

Dr. Clendenan, at the time of his visit to my son Henry, stated it was not diphtheria, only common sore throat, and that the two little girls, who at that time did not have the disease, if attacked would have it lightly—after Robert's death was the first intimation as regards isolation.

(Sgd.) MARY MC LUHAN.

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Arthur Edmond Clendenan, M.D., Toronto University, Conn, township of West Luther, county of Wellington, being sworn, deposed as follows:

I saw the first patient of the McLuhan family on the 23rd June, 1895—the patient's age about twenty-three years. The patient consulted me at my office at Conn. His temperature was about 100 degrees; appetite good; examined throat, found some spots on the back of throat, and I also noticed there was a hoarseness and difficulty in speaking. I diagnosed the disease as laryngitis, combined with pharyngitis. I informed him that the disease might or might not be infectious; the patient received medicines from my office once, and called three times at my office, but I did not see him for eight or ten days after the first consultation. No measures of disinfection or isolation were practised by the McLuhan family, so far as I know. I next saw the patient about eight or ten days after the first consultation; I examined his throat and found membrane which was beginning to peel off. I inferred from seeing the patient going about *that he had not been* confined to his room and had not been isolated.

On July 6th I visited the McLuhan family, and saw Henry McLuhan. I found that he had well marked laryngitis with symptoms of fibrinous exudation in trachea and lower parts of pharynx, which was shown by hoarseness, difficulty in breathing and cough. Within four or five days four others of the family showed symptoms of the same disease; in two of the cases there was pharyngitis with membrane, and in two there were spots in their throats—in two of these cases last described laryngitis appeared from the first. I consider that forms of sore throat other than diphtheria are communicable, and I do not consider isolation in such cases necessary. In distinguishing between membranous croup and laryngeal diphtheria a bacteriological examination is required.

I have never received a copy of the Diphtheria Regulations and was not aware of the nature of them. I am aware that facilities for the examination of membrane in doubtful cases of sore throat have been supplied by the Provincial Board of Health. I would isolate cases of diphtheria for a period of one month or longer. There were three cases in the same family affected in a similar manner; of the eight cases five terminated fatally and three are convalescent. In those three cases there has been some pharyngeal but more laryngeal symptoms of paralysis.

(Sgd)      ARTHUR EDMOND CLENDENAN.

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Robert Menzie Mitchell, M.D.C.M., Medical Health Officer, township of Proton, being sworn, deposed as follows:

I am Medical Health Officer of the township of Proton. I first heard of the sickness in Mr. McLuhan's family August 15th. The local board of health met August 17th. I went to the McLuhan homestead, August 19th, along with Mr. McKenzie, a member of the local board of health. I examined the house and premises and found them in a good sanitary condition; disinfection had been done by the people of the house. There were three rooms on the ground floor and three on the first floor of the house. There was an attic room above the fourth floor. There was also a one-story kitchen extension, connecting with the ground floor. I ordered the above mentioned attic to be treated with carbolic acid fumes. The kitchen I also ordered to be treated in the same fashion, after the wooden walls had been stripped of paper. The carpets taken from the floors of the rooms used by the patients were burned, some curtains were burned and some put in boiling water. The clothing was destroyed or put in boiling water. Feather beds were also put in boiling water (feathers and cover). Some of the clothing was treated by dry heat in an oven. Mr. L. Beard practising isolation and disinfection in contagious diseases. The three children who had had the disease had paralysis of the throat. Liquids were regurgitated back through the nostrils when the patients endeavored to swallow. There was also weakness of the voice. They were able to walk about.

(Sgd.)      R. M. MITCHELL, M.D.

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James McLuhan, farmer, township of West Luther, being sworn, deposed as follows: William McLuhan was at a raising at George Gibson's, in West Luther, on Tuesday, and on Friday was at my place and complained of feeling poorly—ill, and in need of rest—tired, and threw himself down on the grass, which was

not his nature. On Sunday following met him riding home in a carriage from visiting the doctor; his neck was swelled on the right side and his throat was very sore. I did not see him for four days afterwards, on the day preparatory to the raising at his father's. I saw him at the house. I looked at his throat; he had much difficulty in opening his mouth and protruding his tongue, so that I could not see down his throat. He was much reduced in flesh. Isolation resulted from the efforts of witness solely; thinks if all the children had been taken away their lives might have been saved.

(Sgd.) JAMES McLUHAN.

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Elizabeth Funston, the wife of Thomas Philip, being sworn, deposed as follows:

I went to his father's house on the day of the raising and saw William, he was very ill on that day. I asked the doctor if it was not right to use carbolic acid, the doctor did not think there was any danger of disease being contagious.

(Sgd.) ELIZABETH PHILIP.

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Joseph McArdle, chairman of local board of health, township of Proton, being sworn, deposes as follows:

Members of local board of health are all members of the Council. For the last three years the Council has appointed the members for its own body, and all members of the Board are present at the meetings, the expenditure on account of the Board to date, about \$50.00, the population of township, 2,930, the assessment \$804,710.00. The Medical Health Officer is appointed each year, remuneration according to service rendered, no annual salary paid. And we have no special sanitary officer, I know nothing about the supply of blanks relating to contagious diseases, to medical practitioners and school teachers; when a case of contagious disease is reported, the procedure taken is as follows:

A meeting of the Board is summoned, and attendance of Medical Health Officer required, and directions given him as to steps to be taken, which he is to carry out. Where the case arises of persons who are unable to carry out disinfection or isolation to prevent spread of disease through poverty, the Local Board would in such case defray expense incurred.

(Sgd.) JOSEPH MCARDLE.

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Dr. A. Ed. Clendenan, recalled. After the attack of the second one, (Henry), I pronounced the disease malignant, croupous, but not diphtheritic in its character. I understood that the healthy ones were in the back part of the house, after the death of Henry.

I consulted with Dr. McPhaden, Mount Forest, and he agreed with me as to treatment.

(Sgd.) A. E. CLENDENAN.



From the evidence submitted showing the extreme fatality of the disease, five cases out of eight having terminated in death, and the three survivors having had paralysis of the throat with regurgitation through the nostrils, when they attempted to swallow liquids; the contagiousness of the disease, it having spread from the patient first attacked, the young man William McLuhan, to his brothers and sisters, there is strong reason to think the disease in question was diphtheria. It is quite true that membranous croup is an extremely fatal disease; but it is "everywhere a rare disease, excluding, it will be borne in mind, its occurrence as a complication of diphtheria." (Flint, p. 298, V. Edition.)

The season of the year when the disease prevailed, July, and the absence of measles or scarlatina, in which membranous croup, sometimes occurs as a complication, negatives the diagnosis of membranous croup. A bacteriological examination of a culture made from the secretions of the throat, taken from one of the survivors, might have been made by your bacteriologist, but as over one month had elapsed since the convalescent patient had taken the disease, it was not thought advisable to make the attempt.

Country physicians are often at a loss as to what opinion should be expressed in doubtful cases of throat disease, with exudation in the fauces, or pharynx, and particularly when laryngeal symptoms are present. The difficulty is to pronounce on the causation of the disease with which they are confronted. In many cases of tonsillitis, (follicular) very little treatment is required and isolation is but temporarily necessary. Then again, treatment would vary little, no matter whether the disease should prove to be membranous croup or diphtheritic laryngitis; for either disease shows an enormous mortality. This certainly has been true up to the present, but antitoxin seems to have been recently very beneficial in diphtheria. It is true that your Board offers facilities through the bacteriological laboratory in discriminating between diphtheria and other forms of throat disease. At least twenty-four hours would however elapse before the practitioner would be in a position to decide positively as to the nature of the disease. In the meantime he would have to admit that he could not diagnose the disease, or in order to be perfectly safe, would have to pronounce the case diphtheria, and act accordingly, on insufficient evidence.

Such situations are puzzling to a physician, who has to earn his livelihood, and who, while willing and anxious to comply with the law of notification, is not willing by his own action to acknowledge his insufficiency in diagnosis, and perhaps by this very confession of weakness open the way to a rival in practice, who may also be the medical health officer of the municipality.

In the opinion of your Committee, the most that can be expected of the practitioner in doubtful cases of membranous croup and in all suspected cases of diphtheria, is to report immediately to the Local Board of Health, or to the medical health officer. The onus of clearing up the causation of these obscure cases, should then rest on the Local Board or its executive officer.

It would be the duty of the local board to procure the necessary evidence, (bacteriological) if required, as soon as possible in the public interest, acting in the meantime as if the suspected case of diphtheria, were really that disease.

It would also be well that section 3 of the Regulations *re* Diphtheria, should be amended by inserting after the word "diphtheria" in the second line, the words "or membranous croup."

A circular might also be issued to all practitioners in Ontario, warning them, that by not notifying these cases of suspected diphtheria to the local board of health, they assume a responsibility, which properly belongs to the

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municipal health department, and leave themselves open to a serious charge of neglect of professional duty, and of violation of the Public Health Act. The diphtheria regulations should be sent annually to every physician and Local board of health in Ontario.

All of which is respectfully submitted,

(Sgd.) J. D. MACDONALD,  
J. J. CASSIDY.

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## REPORT ON THE PROPOSED WATER SUPPLY OF PORT HOPE

BY THE COMMITTEE ON WATER SUPPLIES.

TORONTO, May 14th, 1895.

*To the Chairman and Members of the Provincial Board of Health of Ontario :*

GENTLEMEN,—Your committee as per instructions contained in a resolution of the Board dated January 19th, 1895, proceeded to Port Hope on May 2nd as per appointment, and met the Medical Health Officer and the Sewer Committee of the council.

The examination of the lake front and the various points of importance in considering the propriety of placing the intake pipe in the lake at the point proposed in the plans was proceeded with and subsequently other possible sources of supply were examined.

In order that the Board may have some idea of the problem before it, the general topography of the town of Port Hope may be given.

The town is situated principally on two hillsides, each sloping towards Smith's creek, which runs from the north into Lake Ontario. The soil is a clay overlying the rock which crops out in the river bottom and at points along the banks of Smith's creek. Thus the lower levels of the town are either rock or clay, while the higher grounds are alternately sands and clay at different levels. Thus sometimes water is obtained at a few feet by digging, while in other cases the wells approach one hundred feet deep. To the north on the west side of Smith's creek the ground dips northerly towards a ravine where flows a creek running easterly, forming a small trout pond. At other points northerly, springs flow out forming three considerable streams, the principal being that supplying Winslow's brewery with a daily flow of about 20,000 gallons. These springs on the hillsides are at the level where the higher sands and gravels met the underlying clay. A similar stratification occurs on the east side of the town with at least one considerable creek flowing westerly to Smith's creek.

As the whole country rises to the north till the height of the Oak Ridges is reached, it may be expected as is the case, that Smith's creek is a considerable stream rising near Kendall, and fed by numerous springs along its route in its rapid descent to the lake. The stream owing to its rapid fall is largely utilized for milling purposes, there being five dams on the streams within the town limits. Naturally on this account the amount falling over the last dam is lessened, but at the time of inspection it had a definite current until the new basin was reached owing to the present low lake level.



From the general outline it will be gathered that there are three possible sources of water supply for the town.

1. The lake (Ontario).

2. Smith's creek above the town.

3. The springs to the north of the town, yielding probably from those in sight with the town limits some 50,000 or 60,000 gallons daily without development.

Referring to these in reverse order, it may be said that with a little care there seems no doubt but that a supply of splendid underground spring water sufficient for all purposes for years to come could be obtained at the points indicated.

As regards the second source of supply, if a pipe were carried up Smith's creek some three-quarters of a mile northward from the last dam, forming Corbett's pond and above the slack water, there would be obtained good spring water subject only to the usual polluting agencies of streams flowing through an agricultural country, with the occasional turbidity common to all streams having clay banks and the additional unpleasantness of being warmer than either of the other sources for a short time in summer. In addition to this it would probably be found that the water main leading from the intake to the stand-pipe would be more expensive in this than in either of the other cases.

The lake supply being the only one which is presented to the Board for approval in the plans submitted, may be briefly described as being a plan for supplying Lake Ontario water by a pipe laid out into some twelve feet of water at a point some 1,150 feet from the shore in a southwesterly direction and to the west of the pier from 1,500 to 2,000 feet from the point at which Smith's creek waters meet those of the lake through the basin at a point some 1,400 feet from the shore line. The proposition is to place the pump-house on the shore opposite this on Smith street inside the foreshore which consists of a beautiful coarse-grained sand beach used as the chief supply of building sand for the town.

The analysis of the water as given below will be found to be that characteristic of Lake Ontario generally, and the supply if maintained in its state of purity will be all that is desired. The objections to placing the pipe at this point are that owing to its being so short a distance from shore the water will be turbid with every storm that beats on the shore, and to the proximity of the outlet of Smith's creek to the intake pipe. That this latter may become serious may be argued from the fact that the intake pipe will be directly in a line toward which an east wind would blow the waters from the creek without any time being given for great diffusion.

Remembering that Port Hope is a town of some 4,800, that Smith's creek is the natural outlet for all existing and future sewage of the town, and that there are already the following sources of pollution, it will be seen that the matter is one of great importance in the consideration of the present and future disposal of the town's sewage. These sources of pollution are (a) Tannery; (b) A number of privies; (c) Queen's hotel and houses connecting with Walton street sewer; (d) Drain from post office; (e) Town Hall sewer with water-closets; (f) Drain from brewery.

The intention is to at once extend the existing sewer up Main street.

Your committee after fully considering the situation is of the opinion that in view of the certainty of present and of future increasing pollution of Smith's



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creek, the proposed point of intake ought not to be approved of by the Board, if the best interests of the public are to be considered, since sooner or later the water supply will become dangerously polluted.

There are, however, two modifications of the plan, either one of which, notably the second, will give to the town a public water of undoubted purity.

1. The extension of the water-pipe farther westward and out several thousand feet into deeper water.

2. The sinking of a well into the sand beach of such a size as will enable a day's supply to be pumped to the stand-pipe, the well filling up continually.

By this simple method, adopted in various places, the water supply will always be obtained free from turbidity, while by filtration the dangers of sewage pollution will be completely removed.

Incidentally it may be remarked that there would seem to be a notable saving in the outlay on the 1,600 feet of 16-inch pipe proposed to be laid into the lake.

A preliminary objection has been raised that the town is already committed to the scheme of laying the intake out into the lake; but as the town council was notified of the law in the matter on the 30th of July, 1894, and the contractor who has undertaken the work was fully aware at the time he made the contract of the provisions of the Act, your Committee can see no reason why the Board should in any way modify its views on a sanitary question under such circumstances.

From the following will be seen the correspondence between the authorities of Port Hope and the Secretary of this Board:

TORONTO, July 30th, 1894.

DEAR SIR,—I notice by to-day's papers that Port Hope is contemplating a new public water supply. In this connection I respectfully draw your attention to section 30 of the Public Health Act, and request you to notify the council and local board of health of the provisions of this section.

I have the honor to be,  
Your obedient servant,

PETER H. BRYCE,  
Secretary.

H. V. SANDERS, Esquire,  
Town Clerk,  
Port Hope.

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TORONTO, November 23rd, 1894.

DEAR DOCTOR,—I learn from newspaper reports that your town intends introducing a supply of public water for drinking purposes. I beg to call your attention to section 30 of the Public Health Act and ask you that you will promptly bring this matter to the attention of the Local Board of Health and town council. I may say that I wrote a letter similar to this asking for information, to the town clerk, but have not received the courtesy of a reply from him.

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Before the work can be legally executed this Board will require to make analyses of the water, as well as to have a sketch map of the point of supply and a statement from yourself as to the possibility of the water supply to contamination from surrounding sources. In order to facilitate your work in this matter I forward you a letter of instructions with regard to taking samples of water.

With kind regards,

I remain,

Yours very truly,

PETER H. BRYCE,  
Secretary.

L. B. POWERS, Esquire, M.D.,  
Port Hope, Ontario.

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PORT HOPE, Dec. 21st, 1896.

DEAR DOCTOR,—You will find enclosed the certificates *re* waterworks. Mr. Stewart, the engineer, of Toronto, will send over to your office a plan of the harbor and showing the exact locality that the water was taken from. I hope the samples arrived all right. Was sorry to send on Friday, but we have had so much delay, and it is very difficult to go out and get water at this season. To-day being a fine day, thought might possibly wait for a week to get out.

Please let me know anything you would suggest and try and give result of water soon.

Yours faithfully,

L. B. POWERS.

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TORONTO, Dec. 27th, 1894.

DEAR DOCTOR,—I have got yours of the 21st and have noted the contents. I shall expect to hear from the engineer regarding the plans.

It is a matter of much importance to know whether the river wash will in the future be likely to affect the water at your point of intake, as at present there must be more or less sewage contamination of the stream, and this must tend to increase rather than diminish.

The whole matter will be reported to the Board at its next quarterly meeting, so that it will be well to have the plans and specifications completed very shortly.

With the season's compliments,

I am, yours faithfully,

PETER H. BRYCE,  
Secretary.

L. B. POWERS, Esquire, M.D.,  
Medical Health Officer, Port Hope.

The committee delayed acting on the instructions of the Board, contained in the following resolution, passed January 19th, 1895, until the spring weather would enable them to make a satisfactory investigation of the various possible sources of supply.

Moved by Dr. Vaux, seconded by Dr. Rae, "That the plans of the proposed waterworks system of Port Hope be referred for further consideration and report to the Standing Committee." Carried.

Your committee would therefore in conclusion recommend that, until the plan of sinking a well in the sand has proved impracticable, the Board approve of this amendment of the plans submitted to it for approval; and that should it at any time in the future be found necessary to extend the pipe into the lake, owing to the increasing consumption of water by the town, the town shall then extend the pipe to such a point as experience shall prove to be free from the danger of sewage pollution, as already indicated, and as shall conform to the views of your Board in this particular. The freedom from objection to the use of Smith's creek for sewage disposal, should the water be pumped from a well in the sand beach, as recommended, ought to be the strongest of reasons for the council modifying the method of obtaining the town's water supply as indicated in the committee's recommendations.

All of which is respectfully submitted,

HARRY E. VAUX,  
PETER H. BRYCE,  
Committee.

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## THE REPORT OF THE COMMITTEE ON PUBLIC WATER SUPPLIES ON THE INVESTIGATION OF THE THAMES WATER AS A SOURCE OF SUPPLY FOR THE CITY OF CHATHAM.

*To the Chairman and Members of the Provincial Board of Health of Ontario.*

TORONTO, May 29th, 1895.

GENTLEMEN,—Your committee on water supplies begs leave to report that as per instructions contained in the resolution of the Board adopted at its meeting on the 17th of May, it continued the investigation of the Thames water, proposed as an adjunct supply of public water for the city of Chatham, and that it instructed Mr. J. J. Mackenzie to proceed to Chatham and make a series of analyses of the filtered water, which was carried on from May 22nd to May 25th inclusive.

Your committee being supplied with the results of these analysis proceeded to Chatham on May 28th and made a detailed analysis of the works of the Chatham Waterworks Company with the following results:

1. That the Chatham Waterworks Company was supplying water from the subterranean wells in Raleigh by a pump at a depth of seventy feet by continuous pumping for twenty-four hours, a daily water supply, amounting the day of our visit to 164,824 gallons from a new well sunk to the rock in October, 1893.



That the original well which had supplied some 300,000 gallons in twenty-four hours had become clogged with clay and was useless, being simply a sink hole for surface water and although within a few feet of the new well, was wholly unaffected by the pumping from it. Further, your committee found two other wells which had been bored on the two acres of the property of the company and had been connected with the pumping well, but which had not, your committee was informed, materially increased the supply obtained from the first well. It may be stated, therefore, that supplying at the pumping station in Raleigh Township a pressure of forty pounds to the square inch, the company were unable to supply more than 164,824 gallons per diem.

After the experience of four years, and after the efforts above indicated, the company found it necessary in keeping with the increasing demand for water and the decreasing amount available from this subterranean source, to seek for an additional supply to supplant that from Raleigh.

After consideration, the company decided in the beginning of 1895 to filter the Thames water by the Hyatt filter, or what is now known as the filter of the New York Filter Company.

Notifying this Board through its secretary of the changed conditions in March last, and of its decision, the company requested that the Board investigate the results of their new operation, as by the terms of its agreement with the town of Chatham the decision as to the quality of the water was left with the Provincial Board of Health. Your secretary suggested that in order that some accurate idea of the river as a source of supply might be obtained, a series of analyses of the river water for some weeks under different seasonal conditions be made, in order that comparative results with the water after filtration might be obtained.

The results of the analysis made by Mr. J. J. Mackenzie, the analyst of the Board, are herewith submitted.

Briefly summed up, these analysis show :

1. That the river in flood time in March contains, as all rivers and the shores even of the great lakes, increased amounts of organic matter, principally from the washing down of vegetable matters by creeks, etc., as well as from cultivated fields and other sources of impurity along the banks, whether vegetable or animal.

2. That with the incoming of spring and the growth of vegetation with pleasant weather, the condition of the stream, both from the chemical and bacteriological standpoint steadily improved, until during the last month the river water has shown but a moderate turbidity, common to all streams with clay banks, and the chemical analysis showing water by Wauklyn's standard, well within the second class; while the bacteria present were reduced to a number, for a river water, infinitely purer than many of the streams which in Europe or the United States are constantly utilized—even unfiltered—for town purposes. The comparison with different foreign cities, and Toronto lake water are given in the accompanying tables.

The results, chemically, of removing suspended organic matters from the river water by alum precipitation are likewise given in the tables, in order that the amount of dissolved albumenoid ammonia in the water might be shown. The chlorine present in the most turbid samples is seen to be as low as Lake Huron, and to be lower than that commonly present in a normal river water as the result in the sample taken the first of May shows.

With such conditions, the effects of filtration both from the chemical and bacteriological standpoint may now be clearly compared.

Sample No. 1, filtered, shows the chemical analysis of the water taken on May 27th, after filtration, to be in every respect first-class, except in albuminoid ammonia, which is higher than in that precipitated with alum in the laboratory.

Assuming, however, that the river after a week of dry weather, as between May 21st and 28th, was in normal condition chemically, that is, that the suspended organic impurities from storm wash would have had time to settle, the chief value of any examination would be to determine what proportion of bacteria would be removed by filtration from a river water in its normal condition. The tables contained in the appended report of Mr. Mackenzie give the exact results of the work of the filters under varying conditions.

From these results, speaking generally, the filters, when doing work under normal filtering conditions, removed from eighty to eighty-five per cent. of all the bacteria present in the unfiltered water. The number of bacteria left after filtration as compared with many samples of water, both unfiltered and filtered, in different cities, may be seen in appended tables. Briefly, it may be stated that they approach in numbers the minimum fixed by Professor Koch, of Berlin, for a safe water even in such streams as the Spree at Berlin, and at Altona, where very large amounts of sewage enter the stream—that at Altona receiving from the whole city of Hamburg.

As, however, the maximum filtering power of the same class of filters at St. Thomas has not yet been reached at the Chatham station, it may fairly be expected that, when the superintendent has had more experience in the management of the filters, an improvement in this particular will be obtained.

Such, then, briefly outlined, are the main facts connected with the investigation.

While the members of the board have been able to draw individual conclusions from the facts as given above, it may be well that your committee sums up the situation as it appears to it, as affecting the question of health in the matter of using Thames water as a domestic supply.

1. The first point is that of the quality of the Thames water at Chatham, *per se*. The river, as other streams, depends for its supply on springs, either along its banks or in creeks flowing into it, or upon the rainfall on its surface and neighboring fields. This is true, of course, of even the great lakes, and is only a matter of degree as to the proportion from any single source.

2. The pollution of the stream must come along with these several sources of supply, and hence we have cities and towns on its banks, farm-yards and cultivated fields to consider.

Of the first is the City of London, some sixty or more miles away. The sewage of London is largely ponded by the dam below that city, but there is no evidence elsewhere to show that pollution at this distance has been such as to affect a public water supply.

An inspection of the river for five miles above the town shows that a number of farm-yards are situated near the river banks, and that barnyard washings are likely, with heavy rains, when the ground is frozen in spring, to pollute the stream. That the amount of this is at present chemically inappreciable is shown by the extremely low amount of chlorine in the time of flood in March, it (chlorine) being the most delicate test for animal pollution.

As regards vegetable organic matter washed from the banks, etc., while this will be excessive in the spring floods, there seems no evidence to show that it at that time of year is dangerous to health.

3. In one case near the town is a slaughter-house, a source of danger of a serious nature, if it be found to be allowing decomposing animal matter to pass into the river.

4. The possible pollution of the river at the point of intake by the current of the stream, which receives the town sewage of Chatham, flowing upward past the intake at times when the lake water may be higher than the river, must be considered, until proven otherwise, to be a possible source of pollution.

Considering these several points, and what may be done to remove any possible dangers of a polluted supply, your Committee would recommend :

1. That the powers of the Public Health Act and of the Waterworks Act be taken advantage of to prevent avoidable pollution of the stream for a number of miles above the city.

2. That a series of levels be taken to accurately gauge the rise of water in Lake St. Clair, and its effect on the current of the river in Chatham, in order that, if necessary, the intake pipe may be carried to a point in the stream above all danger of pollution from Chatham sewage.

3. That the method of operating the filters so as to obtain the highest degree of filtration be carefully governed by the facts obtained from the bacteriological tests made by Mr. Mackenzie, and such further results as scientific investigation may in the future prove to be practicable.

4. That the City of Chatham is hereby advised that it is the opinion of the Provincial Board of Health that the Thames water may be safely used as a public water supply, judging from the results which have been obtained in the investigations above recorded, and so long as the recommendations made in this report are rigidly followed out—assuming the continuance of the present extent of riparian population along the stream above Chatham.

All of which is respectfully submitted.

HARRY E. VAUX,

Chairman.

PETER H. BRYCE,

J. D. MACDONALD, Committee.

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*(Letter to Local Board of Health, Chatham.)*

TORONTO, January 6th, 1896.

DEAR DOCTOR,—I beg to enclose herewith the bacteriological analysis of the Chatham water supply made by Mr. Mackenzie on December 26th, 1895, also examination made of the St. Thomas water supply.

I regret to find that the examination of the Chatham water supply shows that the work of filtration at the time of making the test was not more satisfactory. There is no doubt but that the condition of the river at the time, in the matter of clay in the water, caused the filter to be overworked in order to supply the amount of water required for the city. The rapid increase of sand resistance within a few hours from three to four pounds to fifteen or sixteen



pounds amply illustrates the point. The possible efficiency of the filter is illustrated by the test of the St. Thomas water, which shows in the unfiltered river water before ponding for sedimentation, practically the same amount of bacteria.

I beg to call your attention and that of your council to clause three (3) of the report adopted by this board in June last, in the matter of filtering the water, which I quote:

"That the method of operating the filters so as to obtain the highest degree of filtration, be carefully governed by the facts obtained from the bacteriological tests made by Mr. Mackenzie, and such further results as scientific investigation may in the future prove to be practicable."

What seems urgently demanded is more filters, and such may be materially assisted by ponding the river water, to allow of a sedimentation of the clay, and along therewith a notable number of the bacteria present.

This is well illustrated in the case of the St. Thomas water.

Trusting that additional filters may be shortly added to the plant,

I remain,

Yours very sincerely,

W. R. HALL, Esq., M.D.,  
M. H. O., Chatham, Ont.

(Sgd.) PETER H. BRYCE,  
Secretary.

*Bacteriological Examination and Tests of the New York Filter at Chatham.*

No.	Date.	Hour.	Rate of pumping per diem in gals.	Alum.	Sand resistance.	Bacteria per c. c. before filtration.	Bacteria per c. c. after filtration.	Per cent. of reduction.	Cleaning of filter.
1..	May 22.	11 a.m. ...	432,000	0.72 grs per gal.	5 lbs.	2,385	....	....	Filter cleaned May 21st, 10 a.m.
2..	May 22.	11 a.m. ...	432,000	0.72	"	5	479	80	
3..	May 22.	11.30 a.m.	432,000	0.72	"	5	1,567	34.3	
4..	May 22.	12 noon ..	432,000	0.72	"	5	890	62.7	Filter cleaned between 11 and 11.30.
5..	May 22.	12 noon ..	432,000	0.72	"	5	630	73.6	
6..	May 22.	1 p.m. ....	432,000	0.72	"	5	550	77.8	
11..	May 23.	3 p.m. ....	432,000	0.72	"	5	1,200	....	Filter cleaned between 3 and 3.30.
10..	May 23.	3 p.m. ....	432,000	0.72	"	5	188	84.4	
12..	May 23.	3.30 p.m.	832,000	1.18	"	5	900	25.	
13..	May 23.	4 p.m. ....	832,000	1.18	"	5	260	78.4	Filter cleaned about 3 p.m.
14..	May 23.	4.30 p.m..	832,000	1.18	"	5	176	85.4	
16..	May 24.	2.30 p.m..	832,000	1.18	"	5	950	....	
17..	May 24.	2.35 p.m..	832,000	1.18	"	5	164	82.8	Filter cleaned about 10 a.m.
18..	May 24.	4.20 p.m..	400,000	No alum	5	....	475	55.8	
19..	May 25	9.45 a.m..	400,000	2 grs. to gal	....	1,100	....	....	
20..	May 25.	9.45 a.m..	400,000	2	"	....	160	85.5	Filter cleaned about 10 a.m.
21..	May 25.	12.25 p.m.	400,000	2	"	....	250	77.3	

*Results of Bacteriological Analyses of Thames River. (Unfiltered).*

Date.	No.	Bacteria per c. c.
March 29th .....	3	9,635
March 29th .....	4	10,570
April 16th .....	7	9,163
April 16th .....	8	9,720
April 23rd .....	10	137,175
April 23rd .....	11	4,550
May 2nd .....	13	2,340
May 2nd .....	14	2,625
May 20th .....	17	1,284
May 20th .....	18	1,680

*Results of Chemical Analyses of Thames River.*

Date.	Appearance		Free ammonia.	Albumenoid ammonia and nitrates.	Nitrogen as nitrates.	Chlorine.	Solids at 700.6.
	Before precipitation.	After precipitation.					
March 30 ..	Muddy.....	Clear .....	0.28	0.44 after precipitation	0.266	2.0	5,960
March 30 ..	Muddy.....	Clear .....	0.295	0.132 after precipitation	0.286	2.0	.....
April 5 ...	Muddy.....	Clear .....	0.1564	0.438 after precipitation	1.02	2.0	.....
April 5 ....	Muddy.....	Clear .....	0.16	0.130 after precipitation	1.00	2.0	470
April 17....	Very turbid ..	Clear .....	0.118	0.135 after precipitation	1.344	3.0	367
April 23....	Slight turbidity	.....	0.028	0.14 after precipitation	1.58	4.0	310
May 1 .....	Slight turbidity	.....	0.014	0.22	0.227	4.0	.....
May 28 ....	Clear .....	.....	0.023	0.34 after precipitation	.....	5.0	Filtered water.

No.	Date.	Locality.	Bacteria per c. c.
7 .....	May 22 .....	Raleigh well, just as it issues from the well.	150
8 .....	May 23 .....	Lake Erie, 2 miles out from Rondeau harbor, surface.	60
9 .....	May 23 .....	Lake Erie, 2 miles out from Rondeau harbor, 30 ft. below surface.	137
15 .....	May 23 .....	Water from wells into which filtered water is pumped.	850

(Analyses by J. J. Mackenzie, B.A.)

*Results of Tests of Hyatt Filter, St. Thomas.*

Date.	Bacteria per c. c. before filtration.	Bacteria per c. c. after filtration.	Filter: cleaned.
October 23rd, 1891..	1,240	44	No. 1, 10 hours before.
October 24th, 1891..	1,380	No. 1 filter, 59 No. 2 filter, 270	No. 2, 5 hours before. Cleaned 10 hours before.
October 26th, 1891..	1,545	Both filters, 70 50	Cleaned just before taking sample.  Cleaned as in first case.

*Monthly Averages of Weekly Examination of Toronto Water. (Lake Ontario.)*

March, 1894.....	5,172	(From city tap.)
April, 1894.....	2,358	(Analyses of Mr. Shuttleworth.)
May, 1894.....	1,172	

*Frankland's Experiments. (London, Eng.)*

Material, six inches in depth.	Bacteria per c. c. before filtration.	Bacteria per c. c. after filtration.	Rate per square ft. per hour.
Ferruginous green sand .....	Initial, 80 After 13 days, 8,000 After 30 days, 1,280	1,000 780	.73 gal. 1.14 "
Iron sponge .....	Initial, 80 After 12 days, 2,800 After 30 days, 1,280	2	0.40 gal. 0.45 "

(Analyses from Massachusetts State Board of Health Report, 1893.)

*Monthly Averages of Bacterial Results showing Normal Efficiency of Lawrence  
(this is where filter beds of sand and gravel are used for filtering  
water) City Filter.*

Month.	Bacteria per c. c.		Per cent. of No. of river bac- teria which appeared in effluent.
	River.	Effluent.	
1893.			
October .....	8,700	130	1.50
November.....	7,200	177	2.46
December.....	9,700	141	1.45
1894.			
January.....	7,300	140	1.92
February .....	8,000	125	1.56
March .....	7,100	100	1.41
April .....	14,700	232	1.58
Average.....	9,000	150	1.67

*Extent of filter 2.5 acres, normal rate of filtration 2,000,000 gallons per acre in 24 hours.*



## REPORT ON THE PROPOSED WATER SUPPLY FOR THE TOWN OF ORANGEVILLE.

TORONTO, June 2nd, 1896.

*To the Chairman and Members of the Provincial Board of Health of Ontario :*

GENTLEMEN,—Acting under the resolution adopted at the special meeting of the Board on May 17th, I visited Orangeville on May 22nd owing to the fact that being on a visit of inspection to Orillia regarding scarlatina and diphtheria prevalent there during several previous months, I found it possible to save time by going to Orangeville in the same trip.

Arriving there I met the Mayor and several members of the town council, and with them proceeded to inspect the several sources proposed as possible supplies of public water for the town.

The first visited was the Ryan, a spring about one and one-half miles from the town, to the north of the Mono and Garafraxa road. Its volume was estimated at 60,000 gallons daily, but its situation was in low ground, not many yards below where the farmyard drained toward the ravine in which it rises.

The second spring was as seen in the rough sketch herewith submitted, the Perfect spring, rising in a shallow valley and gathering up from springy land below and from another valley into a very considerable stream. Its estimated flow on a line with the eastern boundary of the cemetery was 100,000 gallons, but a considerable increase is doubtless possible by developing other springs in the wet land. Of course there would be a considerable amount of organic matter present in that from the bog-land, but as the analyses show, the sample taken where the spring appears above is splendid water. It lies to the south of the cemetery some 500 or 600 feet with cultivated land between, and is probably twenty-five feet lower than the surrounding ground.

The third series of springs are what are called the cemetery springs and rise in the valley, as seen in the sketch, to the north of the cemetery. There are three or more springs flowing out of the bank to the south and the main one in the valley farther west. As suggested at the last meeting, the committee had had the *debris* removed, and all of these were discharging a limited water from the limestone sands and gravels which here as everywhere in the district overlies the blue clay.

These springs feed the creek which as increased near the side-line has an estimated flow of 160,000 gallons per diem. The level is some thirty feet below that of the cemetery high ground to the south, and the upper spring is rather over 100 yards from the nearest grave to the south. The north portion of the cemetery has not many graves, and there is a strip of land along the whole north side of the cemetery grounds which has not been utilized at all.

The fourth spring visited was on the east side of the side-line in another valley rather farther north. The ground around is wooded and a fine flow of water from several springs is seen, these collecting into another creek flowing through the town. Other springs, as the Montgomery spring, rise in the area between the side-line north and that to the east, the whole of them creating a body of water which may, as the town grows, be readily collected and will form one of the finest possible sources of public water in the Province, if guarded against pollution.

The chief attention of the local committee and your Secretary was devoted to the spring in the valley lying north of the cemetery, since it rising farthest west has a height greater than any other, being, I was informed, thirty feet higher than the highest point of the town.

What is at once noticeable in the location of all these springs is that they rise to the west and northwest of the town under the superficial sand and gravels which everywhere overlie the clays or rocks of the central plateau of the Province.

At this point they all have an easterly trend, those to the north following northerly toward Georgian bay, while the others, all of those examined, flow southeasterly through the town. It is thus evident that these underlying clays have a southerly dip. It is a point of much importance as indicating the direction in which it may be in the future found necessary to develop the local supplies. The gathering ground of each, while locally limited by other ravines, is altogether northwesterly to the still higher grounds of the plateau.

The general location described, the character of the ravine to the north of the cemetery may be more exactly described.

As seen by the diagram, its general direction is northwesterly, *i. e.*, away from the cemetery, being at the westerly line of the latter, probably some twenty rods distant.

The valley beyond the westerly spring has much interest, it being quite dry for probably twenty rods, the bottom being overgrown with sod. As, however, the valley grows shallower westward, spring ground is seen in two hillsides, each of which indicate the level of the clay beneath the sand and gravel. This, with the dry character of the valley down to the first spring, indicates that the valley has under the sod a porous soil of sand and gravel mixed with humus brought down by successive spring and autumn rains, overlying the blue clay, at the top of which the springs appear. This black mold is visible in the westerly spring where cleaned out, and accounts for the higher albuminoid ammonia present in this than in the other samples.

The amount of water in sight in the valley at present seems ample for present needs, but the direction of the valley away from the cemetery, and the advisability of gathering the water in such a manner as to prevent possibility of contamination would seem to indicate the desirability of making a series of test-pits up the valley, and after determining the presence of water in the hard pan up the valley to catch it by a series of field tiles or perforated pipes and collect it in a well near the westerly spring, thereby securing absolute freedom from surface pollution and maintaining it at the low temperature of the ground throughout the year, in a manner similar to that practiced at Brantford.

The analyses, the distance from and the sparseness of the graves, as well as the now known absence of danger from cemeteries, except under the crowded conditions of large cemeteries in the cities of the older countries, seem to dispose at once of any possibility of danger from the location of the cemetery; but in order to prevent even the possibility of future danger, it will be advisable that the Board recommend that the area of the cemetery along the north be set apart for pasturage or other similar purpose and burial therein prevented.

It is further recommended that while the source of supply be approved of, it be on the condition that the provisions of the plans be such as to insure freedom from local and surface pollution.

The plans when completed by the engineer will subsequently, under the clause of the Act, be submitted to the Board for approval.

All of which is respectfully submitted,

HARRY E. VAUX, Chairman.

PETER H. BRYCE, Secretary.



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## REPORT ON GALT SEWERAGE SYSTEM.

BY THE COMMITTEE ON SEWERAGE.

TORONTO, May 14th, 1895.

*To the Chairman and Members of the Provincial Board of Health of Ontario :*

GENTLEMEN,—Your Committee having made arrangements with the committee on sewerage of the town council of Galt and with the Medical Health Officer, visited Galt on May 10th and made a survey of the topography of the town in company of the above committee, the Mayor, and Mr. Chipman, the engineer in charge.

From the full and very complete report prepared by the engineer, it was easy to follow the details of the proposed plan and to obtain an accurate idea of the various problems involved in carrying out to a successful issue the proposed system.

Your Committee devoted its attention specially to the question of the urgent necessity for a sewerage system, as indicated by the site of the town being principally on two hillsides inclining toward the Grand river, with an underlying fissured limestone rock cropping out of the east as high as the level of the floor of Mill Creek pond, and having a corresponding level on the west as seen in the excavation made for the aqueduct of the public water supply.

The consequence notably on the east side of the river of these inclined rock strata is that the subsoil rock contains water reaching practically to the surface in some places, cropping out here and there as springs in cellars of the town, and in the area lying below Mill Creek pond cellars even in August having water standing in them, in some instances several feet deep; this cellar water being, according to the statements of the local committee, worse since the blasting of the rock in the laying of the water pipes.

The other area especially demanding immediate sewerage is one which, in addition to the above cause of dampness, is affected during the spring floods and heavy freshets by the rise of the water in the river owing to the very shallow river bed at several points below the main bridge and dam; anchor ice may form in the spring and an ice jam may raise the water some fifteen feet in the river, holding it up for several days at a time. Connections at present made directly from cellars to the river's bank then necessarily result in flooding of cellars with sewage or whatever may be driven back or held up by the high water.

In many of the streets being closely built up the general use of public water and the progressive character of the population making them desire bath-rooms, water-closets and sinks, will rapidly create a demand and necessity for local sewers as soon as the main sewers have been constructed.

With the present population of 7,000 it may be fairly estimated that within ten years 5,000 people will be draining into the town sewerage system, and the Committee has had to consider that feature of the engineer's report dealing with the disposal of the sewage. The Committee wholly agrees with that portion of the report which proposes a main sewer on either bank for receiving all the laterals, and thus completely preventing the present unsightly pollution of the banks of the stream by some twenty-five privies, private drains, sewers from large factories, etc.



Those portions of the report detailing how the sewage can be pumped by small steam plants on either side, thus preventing the flooding of cellars in flood time, while providing for the raising of the sewage to whatever point it may be found most advantageous to develop a sewage farm, are simple, scientific and will no doubt perform efficiently the work intended.

The report further very fully and exhaustively discusses the drainage areas of the river, the conditions of the river at different periods of the year, the dams which affect the distribution of the water, the various polluting agencies, and the probable amount of water at the time of minimum flow, which always happens in hot weather when local nuisance is likely to be greatest. The report points out that with a population of 7,000 such a point of pollution will not be reached for some years when a local nuisance observable to the senses may be caused.

If we estimate the amount of sewage at fifty gallons per head for 5,000 people, we have 250,000 per diem or less than thirty cubic feet of sewage, per second; that is at the minimum flow given by the engineer, there would be one part of sewage to 200 parts of water.

It may, therefore, fairly be concluded that if, with the minimum flow, a pipe delivering sewage into the middle of the river will cause no nuisance perceptible to the senses, that in cooler weather and higher water no trouble from such a source is possible.

Your Committee has, however, further considered that portion of the report dealing with the disposition of sewage on a sewage farm.

From the estimate given it is very evident that in the comparatively small stream of the Grand the water is approaching very much nearer to a point at which it will be recognized as more polluted than any other of our rivers with which the Board has had to deal, excepting the Thames, immediately below London. Guelph, fifteen miles above, is preparing plans for sewerage; Fergus probably will some day have sewers; Berlin and Waterloo effluents, after purification more or less complete, reach the Grand; Hespeler and Preston factory wastes reach the river; while below Galt Paris is polluting the stream to some slight extent and Brantford to a much larger extent. We have to realize that in almost every case these manufacturing centres are growing while the stream is certainly lessening; and though infinitely pure as compared with the ordinary streams of English manufacturing centres, yet, with years, general use of the stream for sewerage may be expected to reach a point where its presence is perceptible.

Dealing with the immediate question of Galt sewage, it may be said that it will not, however, be present in the stream greater to any notable degree for several years than at present, for experience in Brantford and elsewhere has shown that house connections are not numerously made at first, owing to the idea that plumbing is costly. Inasmuch, however, as the impression likely to be made on any person along the stream below Galt, is that sewers are different from drains which have existed, your Committee followed the course of the river from Galt to Glen Morris, a course of six miles. It is a beautiful valley with the high lands sloping to the river bank, with outcrops of rocks here and there, and springs flowing from every hill-side. There is altogether a considerable area of bottom lands which would be temporarily covered in flood-time; and which might very easily become seeded with anthrax, if any polluted material of this kind came from tanneries or woollen mills. The tannery in Galt at present uses only Canadian hides, free from any dangers of this sort, and it is only certain *foreign* wools which seem to be dangerous, otherwise the flooding of the lands

will be a benefit, depositing thereon organic matter as a fertilizer, and we are not aware that any other insanitary results have ever come from such occasional deposits.

The abundance of springs everywhere would seem to supply abundant water, should any farmer fear for his cattle from the use of the stream; while nowhere is a house within this area situated conveniently for using the water even were it necessary.

With these facts before it, your Committee begs to make the following recommendations:

1. That the plans and details of the proposed sewerage system for the town of Galt, as set forth in the report of Mr. W. Chipman, the engineer in charge, be approved of, as being such as to meet the sanitary requirements of the town.

2. That from the facts therein set forth and from the Committee's own calculations, it would recommend that the engineer's recommendations with regard to the disposition of the sewage during the period of construction of the works, subject to the condition that the town council obtain the consent of the municipal authorities of North Dumfries, the municipality whose territory lies contiguous to the town on the south and through which the Grand river flows be adopted.

3. That the municipal council of the town of Galt shall require the disinfection of the effluent before discharge into the river of the sewage from any tannery or woollen mill in which South American, South African or Syrian hides or wools are used.

4. That the town council may discharge the sewage into the Grand river at the point indicated in the engineer's report, under the conditions set forth in the preceding clauses of these recommendations, and on the distinct understanding that it shall proceed to the completion of the system by the preparation and use of the sewage farm for the reception of the sewage, whenever the Provincial Board of Health, after investigation of any complaints, shall determine the same to be necessary in the interests of the public health.

All of which is respectfully submitted.

PETER H. BRYCE,  
HARRY E. VAUX,  
E. G. KITCHEN,  
J. D. MACDONALD,

Committee.

## REPORT OF COMMITTEE ON FOODS AND DRINKS, *re* INSPECTION OF CATTLE, MEAT AND MILK.

TORONTO, February 10th, 1896.

*To the Chairman and Members of the Provincial Board of Health:*

GENTLEMEN,—Your Committee on Foods and Drinks has had under consideration the question which was discussed very fully at the last annual meeting of the Executive Health Officers Association in Belleville in August, 1895, and at which a strong resolution was passed urging legislative action in the matter of the inspection of cattle and meat and milk intended for human food. The existing Public Health Act has in section 99 and the amendments thereto, given very extended powers to local boards of health to deal with the matter, and

includes the principal provisions which, from time to time, have been included in the Municipal Act giving power to municipal councils to pass by-laws regarding the inspection of foods.

1. *Legal Power to Inspect.*—In practise, however, the powers given to local boards have not been exercised to the extent which they might have or should have been; but this neglect has largely been due to the lack of means and of officers supplied to local boards by the various municipal councils. As has been frequently stated, this neglect applies equally to the other duties laid upon local boards, if we except the good work of many boards in restricting the spread of contagious diseases of the acute kind. There can be no doubt, however, that the important reason for the inaction has been that the inspection of both cattle, meat and milk, requires knowledge of a special kind, and facilities for making thorough inspections, which exist in our several municipalities, only to a very limited degree.

We learn that there were in Ontario in 1893:

Working oxen .....	5,254
Milch cows.....	803,598
Store cattle (over two years) .....	378,014
Young cattle .....	871,016

or a total cattle population of 2,067,882 in Ontario, and that there were in the same year 1,935,938 sheep and 1,012,022 hogs. We can see, in order that an oversight of 5,000,000 animals be undertaken, that this would mean the institution of measures of an extent which, with our accustomed methods, at present seems beyond the question of possibility—some might say of necessity. The farmer of ordinary intelligence must be supposed to have sufficient interest in the well-being of his stock to see that should disease of an acute contagious kind appear, active measures would be instituted to prevent a more or less complete loss of this source of wealth.

When we find, however, that of this total number of animals 461,501 cattle, 616,237 sheep and 976,358 hogs were sold, we must realize, inasmuch as all may practically be considered as having been sold for the supply of either meat or milk, that the condition of health of these animals at the time of slaughter must have an intimate relation to the health of those persons to whom they are supplied for food.

Of this total, we find that 107,224 cattle, 360,509 sheep (pigs not given) according to the Dominion Year Book, were sold for export, and that 8,190,434 pounds of meat, and 118,589,829 pounds of dairy products were sent to foreign countries. The question, therefore, of the health of these animals becomes one of prime importance, equally from the commercial and public health standpoint. Assuming for the moment that the importing countries are likely, by their laws, to exercise a due supervision of the animals, carcasses and meat and dairy products received by them, we may properly enquire what is the situation with regard to the meat and milk consumed by our own people.

Assuming the approximate correctness of the above returns, we may conclude that the balance of the animals sold were for the supply of meat and milk of our own people. It becomes a difficult matter for calculation as to how many of these were utilized in supplying milk to our non-rural population. We are enabled in some degree to calculate the total number from data, relating to the total animals necessary to supply a given number of customers. I find that in *the enquiry into the milk supply of Brantford*, the several public milkmen supplied 2,021 families, or 10,000 persons. On the basis of five quarts per animal



per diem and one quart per family, 400 cows would be required to supply the town with milk. On the basis of 807,000 of a non-rural population in our cities, towns and villages, we would require some 32,000 milch cows to supply the needs of the population, distributed throughout 478 municipalities. In supplying milk for the production of some 100,000,000 pounds of cheese, 343,372 cows were utilized, so that the balance of nearly 400,000 cows were either employed in the manufacture of butter or were exported. For consumption as meat, we find that since there were 461,001 cattle sold, there were probably slaughtered for home consumption some 300,000, allowing that Ontario exported sixty per cent. of the total of 107,224 sent from Canada in 1893. We thus see that the number of animals demanding inspection as directly employed in supplying human food in Ontario is very large indeed. We have seen that there are 478 rural municipalities, so that the inspection demanded would be some 600 cattle to every municipality, or some 650 cattle per 1,000 on a per capita basis of population.

2. *The Needs for Inspection.*—It is now two years since your Board had printed and distributed 10,000 copies of a very complete report, with the main facts up to that date known with regard to the causation, distribution and prevalence of tuberculosis both in men and animals. The conclusions and recommendations contained in that report regarding tuberculosis in cattle, summed up, were:

*Inspection of cattle:*

- (a) At abattoirs, both of animals and carcasses.
- (b) Of cow byres, and of milk.
- (c) Of cows by tuberculine test.

*Isolation of injected animals:*

- (a) Separation of infected animals.
- (b) Ventilation of stables.
- (c) Food and water prevented from becoming infected.
- (d) Disinfection of stables, utensils, etc.

*Quarantine:*

- (a) Of all imported animals.
- (b) Of all acute contagious diseases in native cattle.

Since that time the great importance of the subject, both from the commercial and sanitary point of view, has caused progressive governments both in Europe and America, to take steps, not only to obtain greater information regarding the disease, but to institute measures for the eradication of tuberculosis in cattle. Already (in 1896) France requires the tuberculine test to be applied to all cattle imported to that country.

Since the publication of that report in 1894 the results of systematic work have established still more firmly every position then taken.\*

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Amongst the most notable publications upon this subject to date are:

- 1st. The full reports of the congress for study of tuberculosis held in 1888-1893, in Paris, and an elaboration of Nocard's views, (Prof. in the Alfort Veterinary College, France), in a work on "The Animal Tuberculoses," brought up to date in 1895.
- 2nd. The conclusions of the Royal Commission on Tuberculosis, England, published early in 1895.
- 3rd. The published proceedings of the Massachusetts State Cattle Commission during 1894, and which are printed very fully in the report appearing in 1895.

At this time it would seem almost unnecessary to quote any statements from these various sources, were it not that there would seem to be a determined attempt on the part of certain persons and newspapers in Ontario, speaking in some cases with authority, to minimize the importance of this scientific work, by using the very arguments which in past years have in succession been used against the contagiousness of every disease, which we now accept without question. Within ten years physicians, as witnesses in courts of law in this Province, have asserted that scarlet fever and diphtheria were not contagious; and twenty-five years ago smallpox was treated in the wards of our general hospitals. With tuberculosis in cattle, the old argument is being used, "it has always been and we have gotten along with it, and since we are not all dead, let us rest and be thankful."

We know, however, that smallpox can be stamped out, and that commercially it pays a hundred times over to act promptly in the first case; and similarly it will soon be found that it pays to stamp out tuberculosis.\*

The following truths, half-truths or actual mis-statements, selected from newspaper articles, illustrate what has been referred to.

*Statement 1.* The report of competent and skilled experts have shown beyond a doubt that there is in this country very little tuberculosis.

*Statement 2.* The Agricultural Department of the Dominion has taken every precaution to prevent the importation to Canada of cattle affected with any of these diseases.

*Statement 3.* Tuberculosis is not always infectious, while pleuro-pneumonia is both infectious and contagious.

*Statement 4.* Galtier of France, fed pigs with the raw flesh of tuberculous cows, but failed to infect them.

*Statement 5.* Nocard fed several litters of kittens with the raw flesh of tuberculous cows, but failed to infect them.

*Statement 6.* Peironcito of Naples, fed eighteen pigs during five months on the flesh of tuberculous cattle, but they did not become infected.

*Statement 7.* Peuch fed two pigs five days on milk drawn from the udder of a tuberculous cow, and slaughtered them fifty-six days afterwards, but no signs of tuberculosis were found.

*Statement 8.* The eminent experimenters, Nocard, Bollinger and McFaydean, claim there is practically no danger in using milk from a tuberculous cow, so long as the udder is not involved, and the same is claimed by most American experimenters.

*Statement 9.* Prof. Law of Cornell, Ithaca, N. Y., carried on a series of experiments over a year ago, and came to the same conclusion.

*Statement 10.* Herschenger of Germany, inoculated rabbits in the abdominal cavity, even with the milk from tuberculous udders, and then only about forty-five per cent. contracted the disease.

*Statement 11.* In view of these facts we certainly believe that the Provincial Health authorities should go slowly in killing farmers' cattle as reported.

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\* Centralblatt, May, 1896.—Denmark, in April, 1893, passed an Act setting aside 50,000 crowns a year for five years for testing young cattle with tuberculin. It was not made compulsory, but the test was supplied free. Not much was attempted at first, but it became so popular that cows of all ages were soon being tested. By Oct., 1895, or in about two years, Prof. Bang reports having inspected 1,972 herds, containing 53,313. Of these 15% only of herds were found free from cases of tubercle. The work had become so popular, all asking for it, that the grant of 50,000 crowns has been increased to 100,000.

*Statement 12.* We are told by some that the only reliable means for detecting the disease is by subjecting each and every cow to the tuberculin test. These are the tests made at Warkworth, and it appears that our Ontario men of science seem more ready to accept this theory of inspection than those of foreign countries.

*Statement 13.* A note in "Hood's Dairyman" is quoted as saying, "that the Swiss Government has refused to enforce a by-law making the tuberculin test compulsory, since to use it greatly increases the danger to human life, by exciting latent tuberculosis into action, which would destroy the animal and render the milk dangerous for human consumption.

*Statement 14.* Prof. Nocard of the Veterinary School, considers tuberculin valuable as a diagnostic, but further says of it, its use is yet in the experimental stage.

Let us examine what are the facts in relation to each of these statements? With regard to the first we are not aware of any systematic inspection of cattle that has been made in any of the Provinces of the Dominion.

In the report of 1894, of the Dominion Department of Agriculture, Prof. D. McEachren, chief inspector, states regarding tuberculosis, "I regret to have to report that this disease continues to appear to be increasing among our herds, judging from the frequent reports and correspondence on the subject. I have pleasure in stating, however, that the percentage of affected herds in Canada is perhaps lower than in any other country, as is seen by the small number of cases met with during the examination of hundreds of lungs at the abattoirs and boucheries."

"It is as yet quite within the lines of possible extermination for a comparatively small outlay for inspectors, tuberculin and indemnity. I would strongly suggest that Parliament be asked to vote the money necessary to rid Canada of the plague, *worse by far than even contagious pleuro-pneumonia.*"

"I beg to report that all imported cattle are tested by tuberculin before being discharged from quarantine."

It is to be hoped that the conclusion of the chief inspector, that there is probably less tuberculosis in Canada than in any other country, is correct; but it is to be feared that the exact experiments made in the herds at different governmental farms will not bear out this opinion.

A statement in the report of the New York State Cattle Commission on tuberculosis in 1891, may perhaps be quoted here. "Tuberculosis in cattle, has been found to exist wherever examinations have been made. There are, of course, many herds entirely free from it, yet it has been found to exist oftentimes by our Commissioner where least expected."

In the report of the Dominion Department of Agriculture, Prof. Saunders Director of Experimental Farms, states that after the tuberculin test and subsequent post-mortem examinations there were at the

Brandon Farm .....	28 animals	21 animals proved tuberculous	75 per cent.
Indian Head Farm..	39 " (3 not tested)	13 "	33 "
Nappan, N.S. ....	39 "	10 "	26 "
Agassiz, B.C. ....	18 "	5 "	28 "
	<hr/> 124	<hr/> 49	<hr/> 40 "

In *Statement 3* it is stated that tuberculosis is not always infectious. If by this we are to understand that in any animal, the disease from its beginning



until its termination, is not contagious in every stage, there is doubtless an element of truth in the statement, but Prof. Nocard's remark will cause us to best understand, the wisdom of making such a generalization. He says:

"Tuberculosis is the type of chronic diseases, its evolution is extremely slow and may last for years. It is found in animals which have exhibited no derangement of their general health, which have shown no falling off as regards fattening or the power of giving milk. *Sometimes, after remaining latent for a long time, the disease all at once exhibits paroxysms and more or less lasting exacerbations, which succeed one another at gradually lessening intervals, and end by exhausting the animal.*"

"Over-driving, prolonged lactation, foods of a bad quality, or some severe inter current malady, are the usual causes of these exacerbations."

Finally, "when the tuberculosis becomes general, the development of the disease is extremely rapid, galloping, so to speak, as in the acute phthisis of man. The fever is lighted up, never to be extinguished. The animals sink visibly, and succumb in a few weeks, in a state of marasmus and exhaustion." "Death is the almost certain termination of bovine tuberculous." (Nocard 1895).

In *Statements 4 and 5*, we find that Galtier of France, Peroncito of Turin, and Prof. Nocard are said to have fed pigs and kittens with the raw flesh of tuberculous cows, and failed to infect them. Now in the work of Prof. Nocard (1895), these additional experiments are referred to as follows:

"Two pigs, five to six months old, were able to eat with impunity considerable quantities of condemned meat. Two kilogrammes on February 26th and 27th; three kilogrammes, on March 14th and 15th; three kilogrammes, on March 24th and 25th; and two kilogrammes, on March 27th and 28th. Thus these four animals, whose great receptivity is undoubted, both as to age and species, were able to eat repeatedly large quantities of tuberculous meat without any of them taking the disease." "This result is all the more impressive from the fact, that two out of the fourteen samples of meat used for the experiments caused tuberculosis in rabbits where the juice was inoculated."

The explanation of these results is fully detailed in the report of the Royal Commission (England) 1895, appointed to "Enquire into the effect of food derived from tuberculous animals on human health."

It states, "we have now to point out the very great difference in one and another part of a tuberculous animal in the amount of tuberculous matter contained in the meat. This matter is found principally in the organs of the animals; as a rule, most abundantly in the lungs, lymphatic glands, serous membranes, but often in the liver, spleen, kidneys, intestines and other structures. These organs are usually removed by the butcher in 'dressing' the carcase, though some of them may, intentionally or not be left. To a practised eye, it is hardly possible that tuberculous matter in these organs can escape detection, and the importance of its presence there will soon be apparent."

"For, in the tissues which go to form the butcher's 'joint' the material of tubercle is not often found, even where the organs exhibit very advanced or generalized tuberculosis; indeed, in muscle and muscle juice, it is very seldom that bacilli are to be met with; perhaps they are somewhat more often to be discovered in bone, or in some small lymphatic gland imbedded in intermuscular fat. Yet there is always a difficulty in making sure of the absence of tuberculous matter from any part of a carcase that shows evidence of tubercle elsewhere."

"In Dr. Sydney Martin's experiments for the detection of tuberculous matter, three kinds of tests were employed; first, minute examination of the part for tubercle, with the aid of the microscope to discover tubercle bacilli; secondly, feeding susceptible animals, test animals, with suspected matter; and, thirdly, introducing into the bodies of test animals some of the suspected matter by way of inoculation, a more delicate test than the process of feeding.

"Applying these tests to the meat substance of twenty-one cows known to be tuberculous in one or another degree, he could not get visible evidence of tubercle except in two instances, and there it was of very small amount. He records the results of his other tests as follows:—'Of eight cows (mild tuberculosis), the meat of one gave positive results in one animal from inoculation: none by feeding. Of eight cows (moderate tuberculosis), the meat of three gave positive results in four animals from inoculation; none by feeding. Of five cows (generalized tuberculosis), four gave positive results either by inoculation or by feeding,' one only out of the four appearing to answer to both tests.

"The animals which have yielded affirmative results to his test of minute examination were not among the last five, and had given no result by feeding test animals with meat from their carcasses, though meat from one of the two had, upon inoculation, responded to the test."

"Taking all the results together, the method of removal of the meat, the results of inoculation and of feeding, one is driven to the conclusion that when meat is infective, it commonly acquires its properties by being accidentally contaminated with tuberculous material during its removal from the carcass. This conclusion, it is evident, is one of great practical importance, bearing directly on the question of the condemnation of the meat of tuberculous cattle for human consumption. And it is evident, also, that the infective properties of meat might vary with different series of experiments, *the result depends on the care taken in guarding against contamination more than on anything else. The conclusion arrived at in part explains the extremely divergent results obtained by previous observers.*"

"Having regard to Dr. Martin's invariable failure to produce tubercular disease by feeding (though he sometimes did succeed by inoculating) test animals with the meat taken by him from cows with mild or moderate tuberculosis, and admitting his explanation of an affirmative result, sometimes seen when meat was being taken from cattle with advanced or generalized tubercle, we are prepared to believe with him that, if sufficient discrimination and care were exercised in taking meat from tuberculous cattle, a great deal of meat from them might, without danger, be consumed by the community. *The practice of public abattoirs on the continent appears to be founded on the same belief.*"

Statement 7 is made that Peuch fed two pigs for five days with milk, and did not infect them. Dr. Woodhead (Royal Commission report), finds that guinea pigs succumbed to tuberculous milk, although it was heated to 80°C for ten minutes.

The report quotes Woodhead:—"It cannot be too strongly insisted on that so long as a single animal is affected with tuberculosis, on injection of the tubercular milk, so long must the milk be held to be dangerous."

The Commission's opinion is:—"And in view of the demonstrated dangers of milk from tuberculous udders, and the possibility of such dangers having to be encountered by human children, amongst other animals, we cannot hesitate to assent to Dr. Woodhead's doctrine."



*Statement 8 and 9*, which is made, that the eminent experimenters Nocard, Bollinger and McFadygean claim there is practically no danger from a tuberculous cow, with no tubercle of the udder, is answered in the following statement:—"Dr. Martin (Royal Commission), had seventeen cows for experiment, fifteen judged tuberculous, two not tuberculous, and were so proved on post-mortem."

"Of the four cows in which the udder disease proved to be non-tubercular, two showed tuberculosis of the internal organs, and two showed no tuberculosis anywhere." "If reliance, therefor, be placed on the general condition of the cow, and on the physical examination of the udder, an accurate diagnosis of tubercular disease of the udder is not possible. Dr. Martin further writes:—"The milk of cows with tuberculosis of the udder possesses a virulence which can only be described as extraordinary."

"Dr. Woodhead again reports:—"A most important point is that the spread of tubercles in the udder goes on with most alarming rapidity. This I was able to observe in the cows constantly under observation."

The latest reports from prominent United States experts, such as those contained in the last report of the Massachusetts Board of Cattle Commissioners, printed in 1895, may be summed up in the following quotation:

"Tuberculosis is a contagious disease, and if an animal has one tubercle in it, who will say that the animal is not already contaminated? Experience has satisfied this Commission that there is but one course to pursue, and that is to destroy all of the animals in which tuberculosis is present regardless of the degree."

*Statements 11, 12, 13 and 14* bearing upon the value of tuberculin as a diagnostic agent, and the expression of opinion as to the scientific correctness of the opinion of this Board in advising taking any action on the results of the tuberculin test, may be dismissed with the following quotations:

Prof. Nocard, in his recent work, 1895, page 47, states:—"In all of the cases (except tuberculosis of respiratory tract), when tuberculosis is confined to the abdominal organs, to serous membranes, or to the glands of cavities, all these methods (already given for diagnosis) are inapplicable, and until lately the veterinary surgeon remained powerless. He could have suspicions, but had no means of acquiring certainty. It is not the same to-day, for we have in tuberculin a certain means of making the diagnosis of tuberculosis even when the signs are quite recent and limited."

In the Royal Commission, 1895 (England), Prof. McFaydean, a most conservative experimenter, says:—"I have no hesitation in saying that taking full account of its imperfections, tuberculin is the most valuable means of diagnosis in tuberculosis that we possess."

In the report of Commission on tuberculosis in cattle (New York, 1895), of which Prof. Law of Cornell University, Ithaca, N. Y., is a member, it is stated:—"As a means of diagnosis, tuberculin is so accurate that a competent veterinarian can now point out any diseased animal. This agent is sensitive when tuberculous processes are present, and the action following its use is practically certain; *and moreover this agent is perfectly harmless in non-tuberculous animals.*" "Prof. Law, a member of the Commission has experimented with it, and reports that no outward effects are produced by tuberculin in test cases, in cattle that are free from tuberculosis."

This same report, contrary to the statement attributed to Prof. Law in *statement already given*, says:—"Tuberculous cattle are valuable to the state



only when dead, and inspection and confiscation can never be detrimental to the interests of the honest dairyman, especially if liberal compensation were granted under well defined conditions."

The report of the Massachusetts Cattle Commissioners, Massachusetts, printed in 1895, says:—"If tuberculin is as efficient as this Commission and others who have used it in large quantities believe it to be, it simply puts in our hands an accurate means of determining the existence of the disease."

From this review of the scientific views held by the most expert investigators of the subject of tuberculosis in cattle, it is abundantly apparent that in no way have the additional experiments altered the bearing of the facts upon the position of the subject since the report to this Board was published in 1894.

We have dealt with the subject of tuberculosis at length; but as pointed out in the last report of the Board, the danger from diseased meat, due to other causes, has for years been considered of great importance and has been subject to regulations of various kinds. The report states:

"Ordinarily exposed to the contaminated air of slaughterhouses, and the impure surface of blocks, floors, cloths and knives, the meat is at once inoculated with the bacteria of putrefaction present in infinite numbers. What names these bear is immaterial for our purpose; what they produce is of supreme importance. All are popularly aware of the dangers from a cut of the dissecting knife, and not less real are the dangers from wounds produced by *inoculations* of impure material on butchers' knives and blocks. But in addition to the dangers of infection from certain microbes, there are produced in the favorable conditions of dirty slaughterhouses, in the washings of the floors, in blood, offal and other tissues left to putrefy or be thrown out into hog-pens to be partially eaten and then to putrefy, not only the microbes but their products as ptomaines, or products of dead tissues and the gases which render the air in their neighborhood a veritable valley of Tophet. The effects of these conditions on the health of the animals subjected thereto is in a general way comprehended from the well-known effects of decomposing organic matters in stables and in poultry-yards, being frequently seen in the latter in outbreaks of choleraic diseases in fowls. But whether appreciable in practice on hogs, there can be no doubt of their influence upon residents living in the vicinity of slaughterhouses and pig-pens. Allied to these is that most noisome of nuisances, a knackery. The volatile compounds from the decomposition of flesh, whether of animals or of fish, have too long been recognized as noxious to permit of any question as to their being nuisances in the sense of rendering the enjoyment of life and property uncomfortable; but their positive influence in causing malaise, nausea and diarrhoea must be considered as unfortunately too well proven to admit of discussion. That they play another potent influence in giving to specific disease a serious or even fatal character has now been equally well proven by positive experiments."

With these facts before us, we may now turn to some of the remedies which have been proposed for lessening the dangers to the public health resulting from the existence of disease in cattle.

3. *Remedies for lessening dangers to the public.* The present position of the English Act in regard to tuberculosis is seen in the further report of Prof. Brown, of the Agricultural Department of the Local Government Board of Great Britain, added to the report of the Royal Commission already referred to.



"For some years past complaints have been made of losses inflicted on stock-owners, owing to the seizure and confiscation of carcasses of animals found to be more or less affected with tubercle on post mortem examination, although during life they had not exhibited any symptoms of the disease.

"It was frequently urged that tuberculosis should be included among the diseases which were dealt with under the provisions of the Contagious Diseases (Animals) Acts, but it was not shown how the provisions of these Acts could be made to apply to the losses which were the subject of complaint. The matter was not, however, dismissed without due consideration of all the circumstances.

"Early in 1888 the Lord President appointed a Departmental Committee to consider, among other matters, the best method of dealing with tuberculosis, with a view of checking the progress of the disease; the committee reported 'that, in their opinion, tuberculosis should be included in the diseases in the Contagious Diseases (Animals) Acts for the purpose of slaughter and compensation for the seizure and slaughter of diseased animals exposed in markets or fairs,' and there was also a recommendation to the effect that it should be made an indictable offence to breed from animals which were known to be affected with tubercle.

"These recommendations were not adopted by the Privy Council on account of serious difficulties which were emphasized in the report relating to diagnosis, compensation in the case of pedigreed cattle and the improbability of the disease being finally extinguished; indeed the committee only ventured to express a hope that tuberculosis might gradually be reduced to its extent. These points are discussed at length in the annual report of the Veterinary Department for the year 1888.

"Meanwhile the seizure and destruction of carcasses of animals found to be affected with tubercle were strictly carried into effect in some districts, and in April, 1890, the matter was brought prominently under the notice of the Government by a large and representative deputation which waited on the President of the Local Government Board and the President of the Board of Agriculture to urge that something should be done to recoup farmers and meat salesmen for losses sustained by what they considered to be the necessary confiscation of carcasses only slightly affected with tubercle.

"In reply, the members of the deputation were assured that their representations should be carefully considered, and in July of the same year a Royal Commission on Tuberculosis was appointed by Royal Warrant 'To inquire and report what is the effect, if any, of food derived from tuberculous animals on human health; and, if prejudicial, what are the circumstances and conditions with regard to tuberculosis in the animal which produce that effect upon man.'

"After a long and careful inquiry the Commission was enabled to answer the questions suggested in the reference as far as it is possible to answer them.

"Numerous experiments which were conducted by experts acting under the direction of the Commission left no room for doubt as to the ability of meat from tuberculous animals to act prejudicially on animals which consumed it in a raw or imperfectly cooked state.

"Undoubtedly the chief grievance of the meat salesman is the seizure and destruction of the carcasses of animals which immediately before slaughter were, or at least appeared to be, in perfect health and good condition. To avoid this sacrifice of what the witnesses considered to be wholesome food they suggested that a strict inspection of animals before slaughter should be insisted on, and that the authorities should take possession of all diseased animals and compensate the owners.



"The very obvious abuses with which such a system would soon be associated need not be referred to in detail. With the present improved means of diagnosis one benefit would doubtless be gained. *Tuberculous animals might be removed to slaughterhouses, reserved for the purpose, in which the proper means might be provided for destroying or sterilizing meat as might be necessary, without any risk of contaminating the carcasses of healthy animals.*

"There would be difficulties to be overcome in carrying the proposed method into effect, but it need not be assumed that the scheme is impracticable.

"In regard to the question of compensation, which from the point of view of stock-owners and meat salesmen is an essential feature of the scheme, I can only remark that the subject is so entirely outside the terms of the reference that I should not feel justified in offering suggestions. I may, however, be permitted to remark that the hardships of which meat traders complain would be materially lessened under a properly regulated system of meat inspection by persons competent to judge as to the extent and character of the tuberculous deposits, and to devise and carry into effect the necessary means for preventing the accidental contamination of meat in the way which has been described."

Briefly stated the following are the chief laws regulating the importation, transportation and protection against disease of the herds of cattle of different countries and states.

*New York State Cattle Commission, 1892.*—1. Inspectors shall try and find animals suspected of tuberculosis.

2. An order to destroy shall be obeyed.

3. Inspectors are to order quarantine, isolation or any other measures which are considered necessary.

4. Inspector shall advise President of Commission when animals are to be killed.

5. Animals are ticketed (by lock and chain).

6. No one can tell the moment when latent tuberculosis may become general.

7. No country has ever stamped out an animal plague except by killing.

*Massachusetts, 1894. Laws guiding Cattle Commission.*—1. All animals are subject to quarantine until they have been inspected and released by inspector.

2. Every animal which, in the opinion of the inspector, is affected with tuberculosis, must be slaughtered.

3. All animals free from tuberculosis or other contagious disease, shall be branded with the seal of the Cattle Commissioner.

4. The Cattle Commissioners propose to undertake a systematic inspection of all herds in the State.

5. The plan of operation will be the examination of all cattle, by the tuberculin test, followed by the extermination of all diseased animals, disinfection of contaminated premises, and fixed quarantine regulations.

*Maine Laws.*—Sec. 1. The owner or other person having charge of any animal, or meat or milk of any animal affected with tuberculosis or other contagious or infectious disease, who, knowing that the animal is thus affected, shall hold the animal, or its meat or milk, for human food, shall be liable, on conviction, to a fine of not less than five dollars nor more than fifty dollars.



Sec. 2. Whenever a local board of health or its executive officer has notice of, or suspects the existence of, a case of tuberculosis or of glanders in domestic animals, such board or officer shall forthwith investigate or cause to be investigated the truth of such notification or the grounds for such suspicion; and if there appear to be good grounds for believing that such disease is present, the local board of health, or its executive officer, shall notify the State Cattle Commissioners, reciting in said notification the grounds for their belief or suspicion. And it shall be the duty of the owner or other person having charge of any animal which he knows or suspects to be affected, to notify the local board of health at once.

*English Laws.*—Importation and transportation of cattle to England are regulated by general orders of Privy Council under Contagious Diseases (Animals) as to—

- (a) Landing of animals.
- (b) Quarantine.
- (c) Most from Canada and United States are landed at Liverpool.
- (d) No restriction of native cattle except in scheduled infected districts.

This Act requires all railway cars, carriages, and pens to be lime-washed and purified before two o'clock on the day following their use or before being used again for any purpose in scheduled districts. The importance of the inspection is seen in the fact that there were landed (1893) at Liverpool annually some 400,000 cattle; 383,000 sheep; 156,000 swine; 163,000 tons of fresh and compressed meat.

The general powers of municipalities to make by-laws, *re* abattoirs and slaughterhouses are as follows:

1. Any urban sanitary authority may, if they think proper, provide slaughterhouses. They must make laws for the management and charge for the use of the same.
2. Many local Acts provide against the slaughtering of animals elsewhere than in public slaughterhouses.
3. All slaughterhouses constituted since 1875 cannot be used until license of sanitary authorities is obtained.
4. Licenses, since 1890, are annual.
5. It is the duty of English sanitary authorities to license, inspect and register slaughterhouses, byres and knackers' yards, remove filth once, at least, in twenty-four hours, and must have supply of water. A fine of £5 is imposed for any offence, and 10s. per day for continuance of nuisance.
6. Medical officer of staff may at all times inspect buildings, cattle and carcasses, and if the officer finds any animal unfit for food he may seize and carry away before a magistrate, "who is required forthwith to order the same to be further inspected and examined by competent persons."
7. Any one selling horseflesh has to advertise it as such.

Public abattoirs have been established in Huddersfield, Manchester, Liverpool and Swansea. These have been established to remove the evil which existed through defects in management and construction of private slaughterhouses.

8. The city of Huddersfield, with a population of 178,000 in 1891, had passing through the cattle market in the same year, some 8,438 cattle and 2,263 pigs. The number of animals killed in the abattoirs for the same period was as follows: 5,255 beasts, 2,524 calves, 3,000 sheep, 5,985 pigs.



*Law in France.*—Atle. 9. When tuberculosis is discovered in any animal of the bovine species, the prefect is to issue an order to put the animal under the surveillance of the veterinary health officer.

Atle. 10. Every animal recognised to be tuberculous, is to be removed from its neighbor and isolated. It must not be sent away, except in order to be slaughtered. The slaughtering is to take place under the surveillance of the veterinary health officer, who is to make the autopsy, and send to the prefect the written notes of the autopsy within five days of the slaughtering.

Atle. 11. Meat from tuberculous animals is to be excluded from consumption.

(a) If the lesions are generalized, that is to say, are not confined to the visceral organs and their lymphatic glands.

(b) If the lesions, although localized, have invaded the greater part of the viscus, or show themselves by an eruption on the walls of the chest, or of abdominal cavity.

(c) This meat forbidden as food, and also the tuberculous viscera, are not allowed to be used for the feeding of animals, but must be destroyed.

Atle. 12. The use of the skin is not permitted till after disinfection.

The sale and use of meat coming from tuberculous cows is forbidden.

However, the milk can be used on the spot for the feeding of animals after it has been boiled.

*Laws in Germany.*—1. The meat of all tuberculous animals is declared to be unwholesome and unfit for consumption.

2. Inspection to be carefully made of all suspected cattle.

*Laws of City of Boston, 1894.*—1. Prior to 1894 all animals showing slight lesions had not been condemned.

2. By Act 1894, (June), all in any way suffering from tuberculosis are condemned.

3. Since November, 1894, Massachusetts Board of Cattle Commissioners has made a systematic examination of all animals at stock yards.

All animals suspected of tuberculosis are condemned as unfit for sale.

4. All healthy are branded and sold anywhere.

5. All condemned are sent to abattoirs and destroyed.

6. All were examined by Cattle Commissioners and regular inspectors of abattoirs.

7. Those found free of disease on slaughter are sold for beef.

8. Number received and condemned : 6.3% tuberculous.

*Municipal Abattoirs.*—The following gives a summary of the rules regulating cattle markets and abattoirs in the several cities of Europe :

*Metropolitan Market, London.*—1. Slaughter floor, 200 x 440 yards square.

2. Only one animal admitted at a time to permit of individual inspection.

3. There is a clerk of the market with two officers to receive dues and prevent the introduction of diseased animals except into special lairs.

5. The abattoirs are near the market.

6. Cattle can go only through certain streets and before mid-day.



*Edinburgh.*—1. Slaughtering can only be carried out in the public abattoir for the city and a radius of two miles of city limits.

2. Penalties for selling diseased meat there are more severe than anywhere in the world.

3. All animals are examined before slaughtering and afterwards.

4. All flesh of diseased animals is destroyed or so treated as not to be used for food.

5. A pleuro-pneumonic animal is destroyed at abattoir, the owner gets three-fourths compensation.

6. Foreign meat has to go to abattoir and be examined before being exposed for sale.

7. The owner of each carcase or part of one pays there a fee of as much as if the animal had been slaughtered there, and he cannot bring herd, bones or hoofs to the city.

8. These regulations rendering imported carcasses dearer than that slaughtered in town has resulted in most animals being brought to slaughterhouse, thereby insuring complete supervision.

9. Pig flesh is not specially examined for trichinæ in Edinburgh and London. Sale of meat is unrestricted, with close inspection.

*Brussels since 1878.*—1. Slaughtering allowed only at abattoirs.

2. Meat inspected and officially stamped.

3. Dead meat brought into town, whether fresh or salt, must be examined and stamped at the station for the purpose. Charges, three centimes per millogramme.

4. Owner of meat must state name, address, destination; this is mentioned in certificate of inspection, with day and hour.

5. Meat must be conveyed direct to destination.

6. Meat introduced to town by private individuals, for their own consumption, is exempt from inspection, but if required they must give name and address.

7. It is not permitted to transport meat from towns other than those named.

8. Offal can only be prepared at the abattoir. Abattoirs much the same as elsewhere; intestines collected in a room for dressing tripe; here opened and contents cast on ground. Paunches are there treated and prepared for tripe.

9. Abattoirs municipal property.

10. It is forbidden to kill and dress animals for food, to melt coarse fat, to prepare and cook offal except in the public abattoir.

11. All tripe dressers and fat boilers get space at abattoir, but must submit plans of stoves, etc., to burgomasters.

12. *Staff.*—1. Chief inspector, a veterinary surgeon.

2. Expert inspector is a veterinarian or experienced butcher.

3. A collector, a chief of service or custom's officer.

4. Duty of inspector, to examine all animals entering abattoir and all meat before being taken away.

5. Animals intended for sale are previously visited.



*Paris.*—1. Cattle can only be killed in municipal abattoirs.

2. All cattle injured in transit must be inspected before meat can be sold.

3. In all cases the meat of animals dying a natural death must be destroyed at expense of owner.

4. Beasts suspected of disease must be kept in separate place and killed only in presence of inspector, who must examine viscera. Meat and offal must all be examined.

5. If lymphatics are affected with tuberculosis, seizure is imperative, otherwise only parts injured are condemned. In all examinations at least a quarter of the animal must be submitted to inspection.

6. Veterinary inspectors are at all abattoirs.

7. All establishments for making tripe, sausages and rendering fat, are at the abattoir.

8. The largest and most modern is that at La Villette.

*Berlin.*—1. Councils are required to establish compulsory inspection of animals for slaughter and of meat before it is exposed for sale.

2. Abattoirs contain ground of about twenty-two acres.

3. Suspected animals from country are set apart for observation.

4. Seized meat must be placed in police officer's office.

5. Rendering rooms, tripe rooms, etc., are at the abattoirs.

6. All wagons which have brought cattle are cleaned and disinfected on the spot. Some, 80 per day. They are scrubbed with a brush with a solution of carbonate of soda, 500 grammes per litre of water at 70° C.

*Leipsic.*—This abattoir is a model of its kind.

1. Ground has an area of 115,000 square metres, some twenty-three acres.

2. Floor of abattoirs is covered with cement all sloping toward a centre, through which runs a trench.

3. The offal (paunches, etc.,) are carried towards one spot dipping towards the centre, under this cars, into which contents of paunches are cast therein.

4. Overhead are trolleys, by which the meat is transferred to the adjoining depots where is a refrigerator.

5. Blood as elsewhere, made into albumen and fertilizers.

6. Fat rendering, tripe, etc., carried on at abattoir.

*Vienna.*—1. All cattle brought to Vienna must be accompanied by a certificate of health.

2. On arrival they must be examined by the veterinary surgeon of the city.

3. This great cattle market cost some \$700,000.

4. The cattle market is covered by a strong iron roof, on iron pillars; has room for 4,000 cattle and stables for 2,140 more. The separate place for calves, holds 4,300; market for pigs holds 8,800.

5. The abattoir near the market is similar to those described.



6 According to Austrian law each town is bound to supply and maintain an "Aasplat," *i.e.*, an establishment where diseased animals can be taken and subsequently disposed of. There

(a) All available parts are collected after carcasses are destroyed by thermo-chemical current.

(b) Keeper's house on grounds. All these establishments have rooms for preparing products and also drying rooms.

(c) The carcasses are cut up and cooked in digester; fat separated; glue made; flesh and bones boiled, dried and made into manure.

(d) All carcasses which cannot be utilized are put into pits and covered with lime.

By a reference to the foregoing summary of laws, both national and municipal, we at once discern the existence of the more or less distinctive principles underlying the work of cattle inspection.

The one is that which is represented in Canada by the powers of the Federal Government to control by legislation, quarantine and local inspection, the importation and exportation of cattle and their products, when such work is seemingly demanded by the commercial interests of the state.

This is illustrated by the Orders-in-Council, which regulate the inspection and slaughter of all food products imported into England from foreign countries, and by the scheduling of certain districts of Britain, when such a disease as pleuro-pneumonia or rinderpest have there become epidemic in native herds of cattle. Similarly in Germany, the inspection of foreign cattle and meat is rigorously carried out by the Imperial Government, and common action urged upon all the Federal states.

The first steps in this direction seriously taken in the United States were then established under the law of 1884, by which the Federal Bureau of Animal Industries undertook the inspection of all dead meat intended for export by the great meat companies of Chicago, etc. This is to be supplemented in a most extended way, under the bill at present under consideration by Congress, for dealing with such diseases as tuberculosis.

The second principle is likewise similar to that carried out, to some extent in Canada, whereby the States and Provinces enact laws giving State Legislatures powers of general supervision of the work, which under municipal law is required to be carried out by municipal authorities. These general powers are in some German states, and especially in the United States of America, supplemented by such executive boards, as those of the State Cattle Commissions, which are appointed by the State and are empowered to appoint sub-inspectors, clothed with authority to go into all parts of the State and condemn diseased cattle, as well as to prohibit, as in Massachusetts, the importation of any cattle without their being subjected to the closest inspection, and where found diseased, destroyed.

In Canada this latter principle has not yet been put into operation, Provincial authorities so far dealing with the work of cattle inspections wholly by means of public health enactments, intended for the protection of man against diseased or unsound food.

In every country, however, this latter principle has for many years been carried out to some extent, municipalities or commissioners being clothed with power to protect their own people by by-laws regulating the slaughter and sale of meat. In Canada, municipalities imitating English practice, have for many years



had by-laws, some of which have been incorporated into the Public Health Acts, and made statutory law. These have in Ontario, during the past ten years been notably added to; and to-day Ontario municipalities are empowered to push the matter of municipal inspection of cattle and foods almost to any extent they may deem necessary. With all this legislation, however, after twelve years, we find that there does not exist in Ontario, so far as your committee are aware, a single instance in which the inspection of cattle subsequent to slaughter, and before being placed in the hands of the consumer, is systematically carried on, and only in Toronto, and that only for cattle imported by rail, are the cattle seen by a city official prior to slaughter.

That the general health of the Canadian cattle has proved excellent as regards the acute contagious diseases, and given them hitherto, a good name in the British market, must be a matter of congratulation; but the same was to be said of those neighboring states with climates and modes of farming similar to our own.

It would be idle, however, for those who have been engaged in municipal health work during the last ten years, to deny that facts are now frequently being brought to their notice, pointing to the need of exact and systematic supervision of our own town foods, exactly after the manner which has been in practice in a number of the chief cities of Europe for years.

In a preceding part of this report, the methods of inspection and slaughter in Edinburgh, Brussels, Paris, Liepsic, Berlin, Vienna, etc., are given in some detail, but the following are the principal points included in the regulations governing the most complete system:

1. All cattle brought to the city (Vienna), must be accompanied by a certificate of health from the inspector of the municipality where they were bought. In this way the state authority can keep informed as to the presence of disease in any locality.

2. On arrival at the cattle yards, or market, every animal is inspected by a veterinarian, and those suspected of disease, placed in a separate yard or building. According to Austrian law, each town or "commune" is required to maintain an "Aasplat" or establishment where diseased animals can be taken for final disposal. All utilizable parts are collected, the carcasses being destroyed by the thermo-chemical current. This establishment has quarters for preparing the meat as digesters, preparation of artificial manures, etc., all cattle injured in transit must likewise be inspected before meat is sold, and all animals dying a natural death must be buried at the expense of the owner (Brussels).

3. The stock-yards or cattle markets are in some cities of great extent, none, however, equal to that of Chicago.

4. All wagons, as at Berlin, which have transported cattle, are at once washed down with a solution of 500 grammes of carbonate of soda, per litre of water, at temperature of 70°C., some eighty wagons are utilized there daily.

5. In all these cities, at Vienna, Berlin, Edinburgh, Brussels, etc., cattle can only be slaughtered at the abattoirs. This power in Edinburgh extends to the control of the area for two miles outside the limits of the city.

6. The abattoirs and cattle yards are everywhere under the control of a chief inspector, who is a veterinarian and has a staff of trained veterinarians or old experienced butchers. (Brussels).

7. Their duties are to inspect all animals entering the abattoir, and all meat before being taken away. A primary inspection of these animals has been made at the cattle market.



8. All meat which has passed inspection is ticketed and stamped before being transferred to the meat market, which commonly is contiguous to the abattoir.

9. All flesh of animals diseased (Edinburgh) is destroyed or so treated as to not be available for food. An animal (Edinburgh) affected with pleuro-pneumonia has carcase destroyed and the owner gets three-quarters compensation in virtue thereof.

In Paris the rule is, that if the lymphatics are affected with tubercles, seizure of carcase is imperative, otherwise only the parts affected are condemned.

10. The owner of every animal slaughtered at the abattoir pays a fee, and at Edinburgh every owner of a carcase, already killed, has to take it to the abattoir for inspection, and pays as much for this inspection as if the animal had been slaughtered at the abattoir.

11. All foreign meat (Edinburgh), has similarly to go to the abattoir for inspection before being exposed for sale; while in other cities, as Brussels, all dead meat brought into the city, whether fresh or salt, must be examined and stamped at stations established for this purpose.

The charges for inspection (Brussels) is three centimes per millogramme.

12. All meat thus inspected and ticketed must be conveyed direct to its destination, which name and address is registered at the bureau.

13. The sale of meat is unrestricted (Edinburgh), as to shops, but these are under close inspection.

14. No one is permitted (Brussels) to transport meat from towns other than those designated, into that city.

15. In every instance provision is made at the abattoirs for buildings or rooms wherein all the fat-rendering, tripe-making, sausage-making, albumen and fertilizers are carried on.

16. Inspection for trichinæ is made at every German abattoir.

The arrangements of every abattoir in these cities are similar and consist essentially:

1. Of covered lairs or yards paved with concrete or flag-stones. (a) For cattle; (b) for sheep and calves; (c) for pigs.

2. Killing-rooms, first three classes separate.

3. Refrigerator or store-room.

4. Boiler-room.

5. Rooms for fat-rendering, tripe-cleaning, etc.

6. Offices and caretaker's quarters.

Some of these abattoirs and cattle yards are of great extent, one of the most perfect being, that at Leipsic, the ground of which includes 115,000 square metres, or some twenty-three acres. The Vienna cattle market cost \$800,000.

The killing-rooms are paved with concrete, and walls to some six feet from the floor are made of concrete slabs or tiles.

5. *Recommendations.*—We have, in this extended review, indicated the present position both of Canadian herds, and of the situation as regards the supervision of cattle and meat products in Ontario, as compared with other countries.



With regard to the cattle and meat intended for export, it is not for this Board to indicate what steps ought to be adopted to secure for Canadian exports, that standing which would most commend them to the attention of foreign countries. As regards, however, the domestic supply, there seems no room to doubt that as positive measures should be taken, as in neighboring states, to remove from our cattle the opprobrium of tuberculosis and the dangers to the people arising from the use of the meat and milk of such. If it has seemed necessary and advisable for Massachusetts, with a total value of live stock amounting to but \$14,200,178, to appoint a commission armed with all the powers to suppress the disease in cattle, it surely cannot seem too much that Ontario stock, with a value of \$116,070,902, should not only be inspected and protected by stringent enactments, but that our own people be protected against dangers to life proceeding from diseased food products.

If further, the solution of the difficulty is in giving compensation for the destruction of tuberculized cattle, where, as in the five New England States, and New York, New Jersey and Pennsylvania together, the total live stock values of \$313,902,504 are less than three times the values of Ontario stock, surely it cannot be questioned whether it would be from the economic standpoint, profitable, to initiate the same methods for dealing with our own stock.

If, indeed, it be true that our cattle are free from the taint of disease, as many would like to believe, then we could publish a certificate of health that all the world would acknowledge; and if they are not, then with all that is involved in allowing a contagious disease to spread, it seems the height of wisdom and prudence, in the light of all the facts, and the known action being taken in European countries and in at least fourteen neighboring states, where the housing of cattle in winter (the one supreme condition of infection) is not longer than in Ontario, and where the herds have been improved from essentially the same sources of thoroughbred cattle, which may be assumed to have introduced the disease, to institute similar action, and to supplement it by the compulsory establishment of cattle markets and abattoirs for the inspection of all milch cows for our public supply of milk, and of all animals intended for consumption as food for man.

Your committee begs respectfully to move the reception of this report.

Signed,

E. E. KITCHEN,

F. RAE,

P. H. BRYCE.



## REPORT RE LONDON PORK PACKING ESTABLISHMENT.

TORONTO, August 15th, 1895.

*To the Chairman and Members of the Provincial Board of Health:*

GENTLEMEN.—It will be remembered that a report bearing upon this matter was presented to the Board in November of last year, and that it included certain recommendations to the Local Board of Health and the Company.

Owing to complaints being again made as per correspondence submitted, I visited London on July 2nd, and in company with one of the complainants for the residents along the creek, and Mr. Ginge for the Company, went over the factory and sewage disposal works.

As related in last year's report, the factory is kept in most admirable order and quite extensive additions have been made to the sewage disposal works along the lines of last year's report. A series of small beds have been set apart specially for the condensed steam water coming from the rendering tanks and which had more or less of fatty product in it. These beds were ample for the small amount from this source.

A weekly removal of the contents of the settling tank on the main drain takes place, and by a series of shallow tanks in the main wooden conduit, a further opportunity for settling is given, so that the floor washings will pass to the filter beds with as little solid matter as possible. These beds have been greatly enlarged and improved. The three main ditches having a total area of 6x300 feet in all, were wholly renewed this year, the old materials thrown out, and new sand being put in to the depth of nearly three feet. Subsoil drains lead from Nos. 1, 2, 3 to the flat beds across on the lower level, which has been levelled and made new. Of these two lower beds the area is about 100x50 feet.

The attempts made by the Company to place a free effluent into the creek, have been most praise-worthy, nothing that was suggested to them either in the report or by the Local Board being neglected.

The atmosphere within the neighborhood of the beds is very free from the smell or effluvia of decomposition, and the beds seem ample for the passage downward of the sewage.

As there is however, after the passage of the materials through the beds, a slight tinge to the water from some of the sub-soil tiles, it becomes a matter of interest to disclose wherein the failure to filter lies.

It has been the custom to pour one day's sewage into one of the upper ditches. These now as already stated, are all made over by having put in new sand from a sand pit, purchased for this purpose specially. Through this the water filters quite fast and on the day visited the water had quite disappeared from the ditch. Also water had reached the tiles from the lower filter beds and was appearing in the tiles leading to the creek. It is apparent that the filtering material works too rapidly for perfect purification; but there was an additional fact in that there was on the day of our visit a frothiness on the water standing within the flat bed, due to the fact that on that day all the brine from the pickling hogs-heads had been drained off to be recharged.



Apparently then what has happened is that the old film of organic matter with its nitrifying bacteria presumably present on the surface of the old beds was removed, while the growth of the new seems likely to be checked by the occasional dosing with a brine saturated with salt.

After explaining the reason for supposing the beds were not being handled to do the best work, I made the following recommendations, which I have no doubt will be carefully followed out.

1st. Keep the fluids from the rendering tank in their separate beds.

2nd. Run the fluids from the brine tanks into a new and separate small filter bed.

3rd. Spread each day's floor washing over the surface of two ditches instead of one, thereby making the filtering area as great as possible.

4th. Use a cultivator and stir the surface of the ditches once a week by shallow cultivation.

5th. Use milk of lime for precipitating the albumin in the sewage by mixing it before it goes into the tanks.

By a careful carrying out of these additional recommendations, I have no doubt but that a very notable improvement will result in the character of the effluent, which so far as appearance goes at present cannot be said to be bad ; but which contains much albumenoid matter.

With the excessive drought of June and July, the creek was dry, there being no relieving shower ; so that the little accumulations of water in pools lay evaporating with a result that the organic contents became more concentrated and vegetation of green algæ increased on the surface. The effluvia at night-fall were said by the several farmers near by, to be very bad ; but it was not observable during the day, a fact however familiar to us, in connection with many effluvia nuisances.

While advising the Local Board of Health to maintain the close supervision of the filter beds, and while urging their frequent inspection to see that recommendations are carried out, I do not think there can be any nuisance continuing of a very serious character. Certainly there will be none with water in the creek ; but with the Company willing to do everything suggested to cleanse the effluent, I feel certain that the filtering quality of the beds as they grow older will improve, and with experience on the part of those managing, I look forward to seeing an effluent free from objection

I have the honor to present the report for adoption.

Your obedient servant,

PETER H. BRYCE,  
Secretary.



## REPORT ON THE SELECTION OF A SITE FOR A CEMETERY IN MARKDALE, COUNTY OF GREY.

*To the Chairman and Members of the Provincial Board of Health :*

GENTLEMEN,—The Council of Markdale, a village situate at the junction of the Townships of Artemesia and Glenelg, County of Grey, having sent an application to this Board, requesting, on sanitary grounds, an opinion as to the eligibility of one or other of two sites for a cemetery within the limits of the village, I was informed by Dr. Bryce that it would expedite matters, if a representative of this Board would personally examine the proposed sites. Accordingly a letter making an appointment for the 8th inst., having been sent to Mr. W. A. Brown, secretary of the local board of health, and likewise village clerk, your committee went to Markdale on that day. The following residents of the village met and consulted with your committee: Mr. Rae, reeve; Mr. Brown, village clerk; Mr. Armstrong, member of the local board of health; Dr. Ego, medical health officer; Mr. Boland, chairman of the cemetery committee, appointed at a public meeting, and Dr. Sproule, M.P.

Your committee was informed that at a public meeting held in the last week of September, to consider the choice of a site for a cemetery, it was decided by resolution, to submit two sites for approval on sanitary grounds alone. Either site would be purchased and would receive, if selected, the sanction of the local board of health. The villagers, however, would prefer a personal inspection of a member of the Provincial Board of Health, so that they might feel clear to act through the committee having the matter in hand. The Council also, before making a definite selection, and passing the required by-law, wished to submit the matter to your Board, as required by law, (*vide* Sec. 2, "b" Consolidated Municipal Act).

The plan which is herewith exhibited, will enable you to form an idea of the main streets of the village, and the position of each of the two sites. The first site visited belongs to Mr. Marsh, a village hotel-keeper, who is willing to sell his land for a cemetery. It is situated on Toronto street, about five-eighths of a mile from the village centre and is quite close to its southern portion. It consists of six acres of well-cleared land, which slopes gently to the south-east, and drains into a small creek, which winds around the base of the declivity. A never-failing spring of fresh water, also rises on the south-western slope of the declivity. I had a pit dug to the depth of five and one-half feet, in order to learn the quality of the soil. The top layer consists of loam about twelve inches in depth, beneath which is a friable clay, containing a considerable quantity of limestone, and a little quartz sand and about one per cent. of gravel. The nearest house on the same side of the road, is thirty-three rods away; over the way on the opposite side of the road are some farm buildings belonging to Dr. Sproule. The creek which skirts the property, receiving the drainage of surrounding farms, connects with Armstrong's creek, which spreads out into a pond. A saw-mill, about three-quarters of a mile to the west, discharges over a dam. The principal objections urged against this property were: (1) Its proximity to the village; (2) The fouling of the above mentioned creeks by drainage from the cemetery, and (3) The insuitability of the soil. The first objection is of little weight, because there are but few houses in the vicinity, and the population numbers only 950 souls, and is not increasing. The second objection, that a fouling of the water of the creek might ensue, was considered of considerable weight by some of the villagers,



inasmuch, as the future water supply of the village might be taken from the pond near the saw-mill, about three-quarters of a mile distant, to which I have already alluded. The creek might at present be used as a supply of water for fire purposes, but would not be suitable as a supply for potable water, without filtration. It is not likely that any measurable impurity would be added to the waters of this creek from the Marsh site, if used as a cemetery, because the drainage of the water through one hundred yards or more of soil, would purify it; and besides the mortality of the village is only said to be five per annum. Besides the future village water supply may be obtained by boring into the rock, pumping a supply by wind-mill which could be stored in a tank and made to descend by gravitation into mains distributed through the village. The third objection as to the quality of the soil, has a considerable force. The soil is principally clay, and it would therefore be retentive of moisture, so that it cannot be considered as suitable for a burial ground as pure gravel or sandy soil. Returning towards the village centre, we passed the burial ground of the Church of England. This has been used as a cemetery for some years; but after the new site is chosen, it is proposed to close it. The new cemetery site in Markdale will probably be used as a union cemetery by the various Protestant denominations, the Catholics having already a site in the Township of Glenelg. The second site visited, belongs to Mr. Oswald Walker, who is willing to sell his land for cemetery purposes. It lies on Mill street, in a north-easterly direction, and is about five-eighths of a mile from the village centre. It is really the back end of the Walker farm, the front portion of which rests on a village street. This site is six acres in extent. The residential property is not growing so much along Mill street as along Toronto street. The surface of the Walker plot is rough and uneven, many stumps being still present, so much so indeed, that an expenditure of from \$300 to \$400 would be required to clear it up, and make it suitable for a cemetery. The nearest creek runs into the Saugeen River, about half a mile from the site. A section of the soil shows that it consists of three or four inches of loam, lying over a loose, coarse gravel. The objections urged against this site are: (1) That the gravelly soil is so loose, that the sides of a grave dug in it would fall in, shortly after being dug, particularly in spring, and (2) That it would cost \$300 to \$400, to prepare it for cemetery purposes. The first objection has been disproved by actual test, and the reeve, Mr. Rae, states, that the sides of the pit remained quite firm and did not fall in. The second objection, is one which it is not necessary that I should discuss. With regard to the suitability of this site for a cemetery, there can be no question, as a gravelly site is very permeable to air, and permits the rapid decay of dead bodies, which are interred in it. The drainage would be excellent all the year round, and would flow towards the Saugeen River, so that no wells would be injured.

My opinion therefore is that, while the Marsh property, might be used as a cemetery without detriment to the health of the people of Markdale, while it is as accessible as the Walker property, and could be more cheaply converted into a burial ground, it is inferior as a site for a cemetery, particularly owing to the quality of the soil.

In concluding this report, I would refer to the opinion of Dr. George R. Rohé, a distinguished sanitarian, and member of the American Public Health Association, who, in a recently published Text Book of Hygiene, writing of interment says: "The soil of a burial ground should be dry and porous, so as to be easily permeated by the air." In a sandy or gravelly soil, the decay of a corpse is much more rapid than in a moist clayey soil. In the latter the bodies more readily undergo putrefaction, or become converted into a substance termed



adipocere. It has been calculated that in a gravelly soil, the decay of a corpse advances as much in one year, as it would in sand in one and two-thirds and in clay in two to two and one-third years. The decay of dead bodies is principally (if not entirely), dependent upon the presence of living vegetable organisms. If the access of free oxygen is prevented the bacteria of putrefaction will thrive and cause putridity. If, however, the soil is loose, porous and easily permeable by the air, the bacteria of decay will be present and produce their characteristic effects.

For sanitary reasons therefore, I consider the Walker site in Markdale more suitable for a burial ground than the Marsh site; but should it, however, be the view of the majority of the villagers that the convenience of most will best be consulted by the adoption of the Marsh site, it would be well to state that a protest has been received from a resident, whose property is situated very near said property, and that therefore it will be well for the cemetery committee of Markdale, to consult the bearing of sec. 489, sub-section (d) Consolidated Municipal Act, R.S.O., 12 d, 1887, before any final decision is made.

All of which is respectfully submitted,

(Sgd.) J. J. CASSIDY, M.D.

## REPORT OF THE COMMITTEE ON PUBLIC WATER SUPPLIES ON THE WINDSOR OUTBREAK OF TYPHOID FEVER IN 1896.

*To the Chairman and Members of the Provincial Board of Health:*

GENTLEMEN:—As is stated in the evidence appended to this report of Mr. J. A. H. Campbell, Chairman of the Local Board of Health of Windsor, your Board was informed in February of a reported prevalence of typhoid in that city, and that the said Board was recommended by your Secretary, to obtain through physicians and others, a correct report of the prevalence of this and of any similar disease existing in the town. The Local Board, with commendable activity, prepared a blank form of report, and supplied one to each physician, with a request to give detailed answers to the questions contained therein. As stated in the evidence of the same witness, all physicians but one had reported at the time the investigation by your committee was held.

These reports with these several other documents are herewith presented: (a) The conclusions of the Local Board on the physicians' report. (b) A copy of the agreement between Windsor and Walkerville, dated 22nd September, 1893, made the basis of the settlement in the court proceedings, and attached to the judgment thereof. (c) A copy of a report by water commissioners with the report of W. Chipman, C.E., on a plan for obtaining a common supply for water for the two towns, and forming the basis of the aforesaid agreement, also a plan or map of the district. (d) Extracts from minutes of the proceedings of the Local Board of Health since January, 1896. (e) Copy of resolutions adopted by the Windsor Physicians' and Surgeons' Association.

In order that the Board may be in a position to understand the situation in Windsor, your Committee desires to give a brief resumé of the chief facts since the public water supply of Windsor was established.

In 1872 a waterworks station was established at the point indicated on the plan of Mr. Chipman, on the bank of the Detroit river, within the limits of the town of Windsor, where it remains at present, and situated some 3,000 feet

below the township drain, which empties into the river within the town of Walkerville, and which within the town becomes the main sewer. It will be seen that the relative position of the Windsor waterworks and the sewage out-fall confirms the evidence of Dr. Coventry, for some twenty-five years a practitioner in Windsor, and who was mayor in 1881, 1882 and 1883, and medical health officer for some twelve years, that "The water supply from its adoption to the present time has always been contaminated by the material emptied into the river within three-quarters of a mile of the intake pipe, which contamination has at different times consisted of the refuse from cattle barns, pork-packing establishment, glucose and starch works; but worse than all from the contents of the Walkerville sewers. Other contaminations are from factories, and the vegetable material from the shores of Lake St. Clair and from the lake itself and from the southern shore of the Detroit river."

In 1887 the waterworks station was burned and at that time it was stated that Walkerville was willing and anxious to join Windsor in the establishment of a common supply to be taken above the latter town, but that negotiations were broken off. A new pumping house was built, and then or afterwards the intake pipe in the river was extended from 167 to 250 feet into the stream, but a valve was left nearer the shore, 115 feet out, in case a stoppage should take place at the intake proper. Such was the position in 1893 when the Windsor Water Commissioners instituted proceedings against Walkerville.

In the report of the Water Commissioners, included in the pamphlet published before the submission of a by-law on July 7th, 1893, which was defeated, and signed by William Edgar, chairman for the commissioners. W. J. McKee, now M.P.P., and C. E. Fleming, mayor, after quoting analyses by Dr. Pyne, J. J. MacKenzie, B.A., and Prof. Ellis, all asserting the pollution of the river water, it is stated: "These results by competent examiners, coupled with the report by Dr. Bryce, Secretary of the Provincial Board of Health, that he saw about three or four million gallons of sewage emerging in twenty-four hours from one of the Walkerville sewers, coloring the water of the river for two-thirds the distance to the Windsor intake, and our own observation of what is daily taking place, leads to the inevitable conclusion, that in order to supply water fit for use for domestic purposes, we must go above the point of contamination."

On the agreement of the two towns, made on the order of the court September 22nd, 1893, the Council passed a by-law in November, 1893, for the issue of debentures for the construction of the proposed common water main from Askin's point on the plans of Mr. Chipman, but it was afterwards quashed by the courts on the ground as stated in the evidence, that the borrowing limit of the town had been reached. (See evidence of Coventry, Smith and Hall.)

Subsequent to this, at the January elections in 1895, a by-law was submitted for the institution of a filter plant at a cost of \$40,000, the pumping station to remain with the intake in its present position. This by-law was also defeated, and as stated in the evidence of Dr. Casgrain, now chairman of the Board of Water Commissioners: "Since then the principal work was to extend the present intake 500 feet into the river by a twenty-inch pipe, and the construction of a fifty-foot well by eighteen feet deep, with two compartments, at an estimated cost of \$12,000."

No analyses of water have been made during this period; the water supply has been bad; but notably so since the flood at the beginning of January. At that time on one morning, in drawing water from the tap, it had a strong smell



and tasted of manure. This lasted until afternoon, when the water was blown out of the hydrants. The cause of the sudden influx of manure was stated to me by a workman from Walker's, to be due to the breaking of an embankment around the field, and as the manure did not come so much by afternoon it was stated to me the embankment was repaired."

This, then, briefly stated, is the history of the Windsor waterworks, as given by town officials and official documents, down to January 25th, 1896, when the circumstances just stated occurred, and which became the occasion, according to unanimous medical testimony and the sworn statements of the present Water Commissioners, of a sudden explosion of fever, which had spent itself largely by the middle of March.

*Specific Evidence of Pollution from Walkerville Sewage.*

1. In a report of your Secretary made in May, 1891, it is stated: "When seen by me, the sewer (Walkerville) was emptying probably three or four million gallons of sewage in twenty-four hours, which was of a brown color, and gave off the characteristic smell of cow manure." The black stream of liquid in its course down the river was visible for two-thirds of the above distance (less than 3,000 feet).

2. The report on Windsor water supply made to the Provincial Board October 12th, 1893, by Mr. J. J. Mackenzie, states: "Whilst in Windsor attending the trial, Dr. Bryce, Mr. Chipman and myself determined to make a test which might possibly settle the question as to whether pollution existed or not. With that end in view, there were procured two barrels of salt, which were emptied into an ordinary water cart containing 600 gallons of water. The water was heated by passing live steam through it until the salt was all dissolved, and the brine thus obtained was taken up into Walkerville and emptied into the sewer about 200 yards from the point at which it opens into the river. At the same time a float was dropped into the river at the sewer outlet as soon as the flood of brine reached that point, that being indicated by the sudden increase of the flow. Shortly after this float passed the Windsor waterworks intake samples of water were taken from the river at that point, (both surface and deep) and at the same time from the tap in the Windsor waterworks pumping house.

Twenty samples in all were analyzed by the salt test.

The average chlorine in the normal river water at three points shallow and deep was 1.5 per million parts.

Of six samples during the salt flow, the average was 3.15 parts per million, the lowest being 2.8, and the highest 3.5.

On the passing of the salt flow the river water fell slightly below the normal, probably due to the temporary flushing of the sewer.

3. The flood of manure which came down on January 25th, 1896, so as to cause the water to taste and smell of manure in taps in all parts of Windsor.

4. A test made by John Davis, Esq., Inspector of Distilleries, as given in sworn evidence.

"About the month of June some three years ago, I happened to be boating near the water pipe, and arranged a jug so that the cork was forced in by the water pressure at about twenty feet from the surface in thirty feet of water. I compared the sample with one taken from the surface at about the same point,



and allowed them to sediment in graduated tubes. I found within eighteen hours that the amount of sediment in the deep sample was four times that on the surface. As a result of this test there has not been since then a drop of water in my house drunk without boiling and filtering. We have not since had any sickness, while before that Dr. Casgrain would bear evidence that we were seldom without it."

*Evidence of the Recent Outbreak of Fever.*

All the sworn evidence agrees that there was a freshet in the end of January, and that notably it was at its height on January 25th, the ice in the river having broken up, and according to the chief engineer of the waterworks, the river was filled with floating ice. On the 10th of March, 1896, the following resolution, according to statement of the Secretary, was unanimously adopted by the Windsor Physicians' and Surgeons' Association:

*Resolved*,—"That this Association is unanimously of the opinion that the present epidemic of typhoid and gastro-intestinal fever in Windsor is due to polluted water supplied to inhabitants and we hereby reiterate the opinion of last year that nothing short of a new water intake pipe above the point of pollution will ensure the safety of the health and lives of the inhabitants."

According to the report of the Local Board on the reports sent in by physicians in regard to the outbreak it is stated that all except one resident physician had reported. In the evidence of one physician of Walkerville it is stated "that he had five cases actually tabulated." Excluding references by several physicians to mild cases not returned, and others which occurred up to the 15th of March, and subsequent to the returns made by them, these would make 167 cases of fever.

The following is a summary of the statistics given in the reports of the physicians:

Reports received.....	12
" giving details in full.....	7
" giving no cases.....	2
" giving cases with no details.....	3
" giving no opinion. ....	2
" giving cases with no details, but opinion that water was cause.....	2
" giving details, classifying fever as typhoid, with other cases as bilious remittent.....	1
" classifying fever as typhoid and gastro-intestinal....	1
" classifying fever as typhoid and bilious with typhoid symptoms .....	1
" classifying all cases as gastro-intestinal .....	1
" classifying fever as typhoid, and divided into severe, ordinary and mild types .....	1
" classifying fever as typhoid only.....	1
" classifying fever as typhoid mild.....	1
Total cases with names and addresses given.....	126
" without names or addresses.....	36
" in all to time of reports being made out.....	162

*Cases by weeks—*

Week ending	December 3rd, 1895.....	3	}	9
"	" 10th, 1895.....	1		
"	" 17th, 1895.....	2		
"	" 24th, 1895.....	2		
"	" 31st, 1895.....	1	}	18
"	January 7th, 1896.....	3		
"	" 14th, 1896.....	5		
"	" 21st, 1896.....	3		
"	" 28th, 1896.....	7	}	82
"	February 4th, 1896.....	17		
"	" 11th, 1896.....	32		
"	" 18th, 1896.....	20		
"	" 25th, 1896.....	13	}	13
"	March 3rd, 1896.....	7		
"	" 10th, 1896.....	3		
"	" 17th, 1896.....	3		

Several facts are apparent from these statistics, and the first is that typhoid in Windsor has not been limited to a single period, but was present in all the winter months, or as stated in Dr. Carney's evidence regarding his experience in Windsor during twenty years: "I ascribe the disappearance of the malaria to surface drainage, and the appearance and increase of gastro-intestinal fever to the pollution of our water supply with animal excreta as well as vegetable."

In the words of other physicians, typhoid is endemic in Windsor, and that this is common medical opinion is seen in the resolution of the Association of June, 1895.

*Copy of Resolutions adopted May, 1895, and sent to Board of Water  
Commissioners by the Medical Society.*

"We are of the opinion that the water supplied to the inhabitants of the city is polluted with washings from the alluvial shores of Lake St. Clair and the Detroit River, besides a large amount of vegetable matter which grows very rapidly in Lake St. Clair.

"It also contains in variable quantities the sewage of the Town of Walkerville.

"We consider it unfit for potable and culinary purposes, and it seems dangerous to the lives of those who drink it.

"We respectfully but strongly urge the necessity of filtering it before it enters the water mains, and, lastly, we are of the opinion that the intake pipe should extend above Walkerville sewers, as without that precaution all other attempts to deal with the question would be contrary to the advice and opinions of sanitarians and at variance with our desire to secure for the people of Windsor a water supply second to none on the continent."

Bearing very directly on this prevalence of typhoid in Windsor is the evidence of Dr. Hoare, for seven years practising in Walkerville. It is so important that it might with advantage be inserted almost in full. That town takes water from the Detroit River above any point of sewage pollution.



The evidence states: "There has been no epidemic of typhoid, on an average only five cases of fever of any kind; can supply rates of typhoid deaths for five years. There has only been one death in this period, and the case was not contracted in Walkerville.

"We have a population of 1,000, and I consider the immunity from typhoid due to water supply being free from sewage contamination and comparatively recent system of sewers."

"Walkerville has during the last three months been free from fever except two cases. One case was typhoid on 1st of January; was a traveller; was at home only a few days at a time in Walkerville; did not consider the contagion local. The other was continued fever of two weeks' duration; if any infection, could only trace it to her having been visiting considerably in Windsor."

Dr. Casgrain, who practises largely in Sandwich, states: "I had in my practice from August till 1st of February, twenty cases. These include two cases in Sandwich, one fatal, previous to the overflow of manure, and eight or ten cases of gastro-intestinal fever subsequent to this overflow. These houses where cases occurred had all Windsor water supply. Had no cases in Walkerville."

The same answer was given by all physicians regarding the absence of cases in their practice in Walkerville. As a matter of fact, it seems that the water in the long main between Windsor and Sandwich, being the source of supply for some hours to Sandwich, the flood of manure did not reach the Sandwich pipes to the same extent as those of Windsor, but notably those east of the Michigan Central Railroad, since the water was emptied from the hydrants within a few hours of the flow of manure into the town supply.

The subject of other exciting causes seems to have occupied the attention of the Local Board of Health, as will be seen in the questions both by the chairman and by Mr. Sheppard put to various witnesses. "Mr. Sheppard asked whether the seventeen cases were not mostly in one neighborhood?" Dr. Reaume—"No." "How many west and how many east of Ouellette Ave.?" "Six west and the rest east." "The east is old Windsor. This district of east Windsor was not before this outbreak, seriously affected with typhoid."

Similarly, "In reply to Mr. Campbell, Dr. Carney stated that his cases had been dotted over the city. Mr. Campbell suggested that most cases were to the east. Dr. Carney stated that even if this were so, the presence of sewers without house drain connections would abate the malarial fever, but ought, too, to abate the typhoid if it be due to bad plumbing since the latter is largely absent."

The point is, however, definitely set at rest by the classifying of cases by streets. There were cases reported in all in forty-two localities, so far as the returns could be tabulated. They were as follows:

Ouellette .....	4	Tuscarora .....	3	Vera Place .....	2
Louis .....	4	Parent .....	1	Opp. E. Central .....	1
Robinson .....	1	Marentette .....	11	Victoria Avenue .....	1
Carter .....	2	Windsor .....	3	Church .....	3
Curry Avenue .....	1	Brant .....	1	Mercer .....	5
Cowan .....	1	Cataraque .....	3	Crawford House .....	5
Langlois .....	1	Erie .....	1	Chatham .....	5
Park Street .....	4	London .....	2	Elm Avenue .....	3
Essex House .....	1	Goyau .....	11	Caron .....	1
Prince Avenue .....	2	Pitt .....	1	Howard .....	1
Glengarry .....	14	McDougall .....	6	Market .....	1
Wellington .....	2	Assumption .....	3	Arthur .....	3
Dougall .....	3	Mich. R. ....	1	Asylum Avenue .....	4
Sandwich .....	3	Pallissier .....	1		

It would seem therefore that the conclusions arrived at in the summary of the Local Board were not based on any detailed study of the tables. Indeed, we



find in the minutes, Mr. Sheppard, a prominent and active member of the Board, to have moved the following resolution on March 8th, 1886 :

Moved by Mr. Sheppard, seconded by Mr. Latham : "That the present water supply is deleterious and dangerous to the public health, and that the adoption of the Howatson silex patent system of filtration in connection with the waterworks is feasible and would be effective, and that resolution be sent to Council."

This does not seem to harmonize with the following evidence of the Chairman : "The Board, after examining reports carefully, as well as from their personal knowledge, unanimously expressed the opinion that if true typhoid existed at all it was of a very mild type. There is no doctor in the Board except the Medical Health Officer, who is not a member." Neither does the latter statement coincide with the view of the Medical Health Officer, who certainly cannot be considered an alarmist, when he says, "With regard to the effects of manure in the water supply, which occurred in January last, I am of the opinion that it was not healthy, and would cause to a certain extent fever of a malarial type, and might cause death."

Moreover, Mayor Mason further states in evidence, "Without a doubt the inshore pipe supplying the water, when open, has shown that the water was polluted by liquid manure retained by an embankment on the Tecumseth road."

To show how the Chairman must have misunderstood the sentiments of his Board, Dr. Bell, a member of the Council states in evidence, "The reason that the typhoid occurred in February was that the manure in the water was the predisposing cause."

There can be little doubt, however, that the essential requirement of the lay mind is, that disease must kill in order to be the real thing, and that since there was not a large percentage of deaths, and because all physicians did not use the same terms for the outbreak of fever, the fact was seized upon by the apologists for the city water, that the fever could not have been typhoid.

The report drawn up by the Local Board further particularly states : "The cases appear to be confined, to a large extent, to one thickly populated part of Windsor." The point made to the extent that it is in accordance with the tabulated statement of cases as given by streets is a most interesting one, and taken in connection with the relative freedom of the Sandwich supply from the flood of manure, is perhaps as perfect an illustration as could be possible of the exactly opposite fact to the conclusions contained in the report of the Local Board as to causation.

As stated in evidence, Windsor pumps 2,000,000 daily. For some six hours, according to the Chairman of the Water Commission, the flow of liquid manure continued. Assuming that the pipes had previously been filled with the average water of the river, the result would be that the filthy water would be in the pipes nearest the intake first, and remain there the longest, since when spreading to other parts of the system the blowing out of the hydrants would have been going on. If this district were thickly populated, a proportionately large amount of manure-laden water would have been used, and its presence would be felt over a large number of days. In summarizing the cases by streets, there is noticed an especially large number of cases on Glengarry street, 15 ; in Goyau street, 11 ; and other high figures as those of McDougall, 6, and Assumption, 5.

In subsequently examining the map of Windsor, we were surprised to find that these are the streets which first received their supply from the main which *passes up* Langlois street, from the pumping well, thence along Wyandotte street.



They are well inhabited streets, but as stated by Dr. Carney, they are not the newest streets, and while all use city water, comparatively few have house-plumbing and house sewers. To complete the illustration, we have found that the streets to the west of the Michigan Central Railroad show few cases of fever. This is explained naturally by the fact that the Sandwich main is carried by a long detour southward, owing to the deep cutting, in order to pass across the track. Thus this part of the city is, like Sandwich, a long way away from the pumping station, and the presence of the manure in the pipes was therefore but little noticed.

There can be no doubt, therefore, as to the conclusive evidence from every known source of exact information, that the explosive outbreak of fever was caused, like all other epidemic outbursts of typhoid have been shown to be directly by polluted water, and that its immediate date of causation is absolutely and definitely fixed, in keeping with the average period of incubation of typhoid, by the flood of liquid manure on the 25th day of January.

However just and proper, therefore, it is for the Local Board of Health to continue to carry out what is stated in the concluding sentence of its report, viz.: "The Board therefore is now turning its attention more particularly to endeavoring to better the unsanitary conditions which appear to be a large factor in the case, it is clear that the conclusion arrived at is unfortunate, since it makes the Board to whom, under the statute is specially delegated the duty of calling attention to causes of disease, to appear before the 10,000 citizens of Windsor as neglecting absolutely by a single recommendation in the report to direct public attention to the plain and obvious cause of the disaster which your committee has been called upon to investigate. Your committee, therefore, without further dealing with the causes of the epidemic, desires to refer to the remedy or remedies which, from the facts collected from a study of cases in the recent outbreak, from the sworn evidence of seventeen physicians, city officials, and prominent citizens, and from the experimental evidence and analysis by officers of your Board, are demanded for the contaminated public supply of the city of Windsor.

From the evidence of the several persons sworn your committee gathers the following statistics :

J. A. H. CAMPBELL, Chairman Local Board of Health, gave as his opinion that the cases of typhoid are not more than could be expected in a population of 10,000, and is of opinion that any prevalence of fever was due to filthy premises.

MAXFIELD SHEPPARD, Member of Local Board of Health: "My view is that the city water supply is at most times very impure; also, my impression therefore was that by extending the intake further out than it now is and introducing some thorough system of filtration, perhaps the greatest measure of relief would be obtained. Of course the results of filtration could be equally well applied above Walkerville."

J. A. ASHBAUGH, M.D., Secretary Medical Association :

"There has been much discussion with regard to removing the intake; but if they could avoid Walkerville sewage, moving the intake and then filtering, we ought to get good water if the filter is good. We have had simply mud water lately."

C. W. HOARE, M.D., M.H.O., of Walkerville :

"I consider the outbreak of typhoid due to the sewage of Walkerville reaching the Windsor intake pipe.

"Walkerville sewage is therefore in my opinion a permanent source of danger to Windsor if it gets into the water supply, which danger can be aggra-



vated at any time by typhoid, cholera, diarrhoea or dysentery, being present in Walkerville

"As a medical health officer, and according to the views of sanitarians, I am of opinion that safety to the Windsor water supply can readily be obtained by going to a point above Walkerville which will be free from sewage contamination."

HENRY RAYMOND CASGRAIN, M.D., Chairman of the Board of Water Commissioners :

"Since January, 1896, the water supply has been bad, but notably so since the flood at the beginning of February.

"My idea of a remedy is to extend the pipe into the river and apply filters. I do not base this opinion as to freedom from pollution at 500 feet from actual experiments. In case the supply were taken from Lake St. Clair, it is my opinion that owing to mud, etc., filtration would equally be necessary."

E. W. S. BAUER, Esq., Member of Water Commission :

"Have heard statement of Dr. Casgrain, as to duties of Water Commission, and agree therewith; also to his statement with regard to flood and impurity from manure. I had a conversation with Dr. Dwyer, a diver, about extending pipe, and he stated that if we extended out into what he called 'blue water,' that we would have the very best of water. I am also of this opinion, but not from personal knowledge."

J. O. REAUME, M.D., M.H.O., of Sandwich East :

"I am inclined to think we are liable to an outbreak of typhoid, under present conditions of our water supply, at any time. So far as I have studied the question, I have come to the conclusion that filtration of the water is necessary."

FORREST F. BELL, M.D., Alderman :

"The reason that the typhoid occurred in February was that the manure in the water was the predisposing cause.

"I think the idea that we are going to filter out typhoid germs is a fraud, and that even though the theory that a patent filter will filter the germs for a time is true, they soon get filthy, and the germs will be no better than a sedimentary bed."

JOHN COVENTRY, M.D., Mayor and ex-Medical Health Officer :

"The water supply from its adoption to the present time has always been contaminated by the material emptied into the river three-quarters of a mile of the intake pipe.

"But the most serious contamination of all is, I consider, the Walkerville sewage; and water contaminated by it, whether unfiltered or filtered, supplied to the inhabitants, is in my opinion a most dangerous water supply."

Mr. BARTLETT, Police Magistrate, made a statement, not on oath, "that he thought going above the sewer would remove all the difficulty from sewage, and thought it could be easily done at a cost of \$30,000 to \$40,000."

R. LAMBERT, M.D., present Medical Health Officer :

"With regard to the effects of manure in the water supply which occurred in January last, I am of the opinion that it was not healthy, and would cause to a certain extent, fever of a malarial type, and might cause death.

"At the time of the outbreak I stated to the mayor that I thought that if the intake pipe were carried out 200 to 300 feet more than it is now, that it would remedy anything that might happen hereafter.



R. CARNEY, M.D., ex-Chairman of Local Board of Health :

"I ascribe the disappearance of malaria to the surface drainage ; and the appearance and increase of gastro-intestinal fever to the pollution of our water supply with animal excreta, as well as vegetable." As chairman of the Local Board of Health I have at different times had a conference with the water commissioners, based solely on this ground and we suggested that they should take such steps as would remedy the pollution, leaving it to their own judgement the scheme to be adopted.

JOHN DAVIS, Esq., ex-Chief Inspector of Distillaries for Canada :

"My opinion is that the public safety will best be consulted by going above Walkerville sewage, and that extension of pipe in its present point will not remove danger of pollution.

D. W. MASON, Mayor of Windsor :

"Without a doubt the intake pipe supplying the water, when open, has shown that the water was polluted by "liquid manure."

"I feel that the present steps that are being taken by the Water Commissioners for extending the intake pipe 500 feet in all would bring us to what is known as the grand body of water, and thereby abate any danger of pollution.

W. NORMAN, C.E., City Engineer :

Regardless of the cost, I would prefer taking the city supply from above Walkerville, moving the pumping plant all up there."

J. H. SMITH, L.D.S., ex-Water Commissioner :

"I am of opinion now, that so far as sentiment goes, and so far as the name that has been given to the city of being satisfied to take its public supply below Walkerville sewer is concerned, it would be well worth the expenditure to the city to take the supply above the Walkerville sewer ; but with the extension of the pipe 200 feet out, and a proper filter, I think Windsor would be supplied with a water practically free from danger."

"There can be no doubt that Windsor has sustained an incalculable loss financially, owing to the opinion that is entertained here and elsewhere, regarding the conditions of its public supply. As a result of this, people are afraid to come to reside in Windsor, or to invest money here, and the town could well afford to spend any ordinary amount to remove the suspicion."

JOHN HALL, Chief Engineer of Waterworks for twenty-one years :

"There has been during all this time sources of animal pollution of the river above the supply, such as those instanced by Dr. Coventry, whose evidence I heard."

"To overcome the sentiment against the intake being below the Walkerville sewer, I think we had better take it above Walkerville."

JOHN BOTT, Mayor of Walkerville, said :

"The water of Lake St. Clair, is at present very muddy and the river Detroit, is itself in a more filthy state than is at all usual." Such a condition of lake and river might be expected after the floods which have existed lately, but ordinarily the lake St. Clair water, as supplied at Walkerville is so clear, that in the house of the witness it is always used unfiltered. The witness is obliged to have the lake water filtered for family use at present. No fever is known to exist in town. Observes a clean streak of water in the centre of the river, of perhaps three-fourths of a mile in breadth, but it is not always to be seen, alter-



ing in appearance with various conditions of the wind. Has observed that under a strong wind, the water is kept up, that the river rises about two feet in twenty-four hours."

The extracts just given from the sworn evidence of fifteen persons out of the sixteen referring to the matter, all express practically but one opinion, as to the polluted character of the Windsor water supply, and every witness except one, including the Police Magistrate, one of the oldest residents of the city, is of the opinion that active steps must be taken to remove both the danger to the citizens, and the discredit which the suspicious character of the water has brought upon the city as a place of residence.

The opinions given as to remedy, may be said to be covered by four propositions.

1st. The maintenance of the pumping station in its present position, and the extension of the pipe to a distance of 500 feet from the shore.

2nd. The maintenance of the pumping station as at present, the extension of the pipe 500 feet, and the establishment of a filtering plant on the shore.

3rd. The changing of the position of the intake, to some point in Walkerville, above the sewer outlet, to a point in the river unaffected by the Walkerville sewage.

4th. The changing of the position of the intake, to some point in Walkerville above the sewer outlet, to a point in the river unaffected by the Walkerville sewage, with the addition of filtration to remove suspended mineral and vegetable impurities, which are often of an excessive and disagreeable character.

The extracts already given, indicate that there is but one view of the needs of the city, and that is an uncontaminated supply; hence your committee has nothing more to do, than to determine which of the several propositions will most perfectly comply with the views so generally expressed by the witnesses, who from their several positions must be considered the best fitted to express correct views on the situation, and to speak for the people as a whole.

With regard to the first proposition, viz., the simple carrying of the intake pipe out 500 feet into what Mayor Mason characterizes as the "grand flow" of the water, it may be said that there can be little doubt, but that the nearer the centre of the current of the river, the less will be the deposits in the stream, and the further from shore pollution.

As has been, however, abundantly shown in the history of all rivers, and likewise in the Detroit river, there is no certainty of any point of the channel being at all times free from the effects of changing currents, caused notably by the changing surface levels, due to piling up of water under the influence of a wind often blowing one or more days from the same quarter. Changes in the great lakes of four and five feet of level have often been noted.

But the experiments already given both by Mr. Davis, and by Mr. Mackenzie, indicate that definite pollution does extend beyond the present intake, and the following results of bacteriological analysis of the samples of water taken by myself on the 14th of April last, in company with Mr. Hall, Chief Engineer and Mr. Reid, ex-Commissioner and made by Mr. Mackenzie, show conclusively the presence of micro-organisms at a time, days after the snow had disappeared from the lands along the river, to an extent quite incompatible with the safe use of the river water in its raw and unfiltered condition.

These samples taken within an hour of one another, were at once packed in ice, and expressed to the laboratory, and plate cultures made within nine hours from time of taking. They arrived there at a temperature of three degrees above



freezing, so that they maybe said to have very closely represented the exact number of bacteria present at the moment of taking.

In the three colums are given the source of sample, the number of bacteria per one cubic centimetre of water, and the presence or absence of bacillus coli communis, the micro-organism always present in sewage, and in manure pollution :

Source.	Bacteria per cubic centimetre.	Bacillus coli communis.
Askin's Point, about 200 feet from shore.....	14,000	Absent.
Walkerville intake.....	13,300	Absent.
Walkerville sewer, 250 feet out and 200 feet below.....	23,164	Absent.
Windsor intake, 500 feet from shore.....	21,000	Absent.
Windsor intake, 250 feet from shore.....	29,874	Numerous.
Windsor intake, 115 feet from shore.....	58,100	Numerous.

For the reasons already given and referred to by Mayor Bott, and Dr. Lambert in evidence, regarding the changing character of the currents, and the river pollution, too much importance must not be attached to a single series of analysis ; but this much is fairly concluded from the figures, viz., that at a time when lake St. Clair is receiving pollution from every side, and is relatively at its worst, it is relatively notably better as regards bacteria present, as shown by the samples taken nearest it, than the river samples taken at Windsor intake, even the one taken 500 feet from off the shore. Thus Askin's point is fifty per cent. better than 500 feet from shore opposite the present intake.

They similarly show that while Walkerville water was getting no sewage, as shown by B. coli, Windsor supply has numerous colonies of B. coli, both at the inshore and outer intakes.

The supposed point at all times of the "grand flow" at 500 feet, as believed by Mayor Mason and the diver Dr. Dwyer, is therefore shown to be mythical and not based upon exact knowledge, since 21,000 bacteria per c.c. were found present at that point

We are therefore driven to set aside the first proposition of simply extending the intake, as a means of securing at all times a safe supply of water.

The second proposition is the same with addition of a filtering plant. With regard to the efficiency of any filter to remove at all times, dangerous germs from sewage polluted water much has been said and written ; but with the classical illustrations during 1892, of the sand bed filters of Altona, of the most approved construction, allowing for a few days in cold weather, cholera germs from Hamburg sewage water to pass through, owing to the bed being overtaxed, a part of the bed having been frozen on the surface, we see how even the best management occasionally fails ; while the Tees epidemic of typhoid, reported upon in two large volumes by the local government board of Great Britain in 1892, shows that the sand filters managed by a water company, were quite defective in protecting against a flood of sewage, washed down during a week of heavy rains. Manifestly therefore while filter plants can do very much as shown in Berlin, London and elsewhere, to improve waters polluted with sewage, your committee cannot for a moment admit the practical wisdom of Windsor, attempting to filter out sewage germs from so near a source as 3,000 feet, (even by sand filters,) when the necessity therefor and the danger therefrom, can be wholly avoided by going above Walkerville, while they have yet to learn that any kind of mechanical filters can do the work more perfectly.



We thus naturally are forced to the conclusion, of most of the witnesses who gave evidence, that the carrying of a pipe above Walkerville sewage is alone a satisfactory method of dealing with the pollution. This it will be remembered, is the basis of the agreement between Windsor and Walkerville, in the litigation of 1893, by which the suit was ended. As a legal document, illustrating how the court and wise lawyers may sometimes prevent the waste of large amounts of money in suits over questions of facts not to be altered by years of litigation your committee gives in full, the consent minutes in the case of *Regina v. Walkerville*.

#### CONSENT MINUTES.

REGINA v. WALKERVILLE:—It is agreed between the parties that the questions in difference shall be settled between the parties in the following manner:

1. An iron intake pipe of not less than thirty inches in diameter shall be extended not less than 400 feet in a northerly direction into the Detroit river from Askin's point, thence along the highway in a westerly direction to Walkerville crossing the present Walkerville intake pipe and thence along the highway; the pipe reduced to twenty-seven inches in diameter to the Windsor waterworks from the time that it crosses the Walkerville system, such pipe to be of first-class material well finished and laid, the whole material and work to be at a cost not less than \$55,000 and not more than \$65,000 to be finished at the cost of Windsor and to the satisfaction of the city engineer, for the time being, of the City of Toronto, in case the parties differ.

2 Walkerville shall contribute on the completion of such work so certified as aforesaid in the proportion of one-tenth cost thereof as above specified.

3. The said pipe shall be jointly used by Windsor and Walkerville in the future as the means of supplying water to both of the said municipalities and nothing shall be done by either of the said municipalities detrimental to the user by the other of such water not to interfere with any arrangements which may be made by the Water Commissioners of Windsor with Sandwich.

4. In case of any breakage or damage arising in the said pipe between the intake and the crossing of the Walkerville waterworks system the same is to be duly and properly repaired by Windsor to the satisfaction of the engineer aforesaid of which repair Walkerville is to pay one-tenth.

5. Both parties are to facilitate Windsor in procuring such legislation as may be needed to effectuate this agreement to bear the expenses thereof in proportion aforesaid.

(Sgd.) By Counsel.

22nd September, 1893.

Settlement in terms of consent minutes annexed hereto judgment accordingly.

It has already been stated why the order of the court, was not carried out in 1893, owing to the courts having quashed a by-law of the Windsor Council.

As stated by Dr. Hoare, M.H.O., of Walkerville, as well as one as one of the gentlemen interested in the Walkerville waterworks, that town is still quite willing to carry out its part of the agreement.

The fourth proposition is, that in addition to carrying a pipe above Walkerville, a filtration plant be in addition established there, by which both towns can be supplied with filtered water.

As to the necessity of this, we have this in Dr. Hoare's evidence. Mr. Sheppard asked if he thought the service would be sufficient without a filter? Dr. Hoare believed that so far as typhoid is concerned, his experience taught him that it would.

In as much as the question of filtration adds additional expense, the point made is important. Your committee, however would refer you to the evidence of Mayor Bott, of Walkerville, already quoted, that he is, "obliged to have the lake water filtered for family use at present," and to the great dissatisfaction which from many quarters, as at Hamilton, Toronto, Detroit, Cleveland, etc., is expressed at the use of the water which becomes turbid with every storm, and remains so for several days. Detroit, which fortunately is in a position to get its water nearer the river current, has already adopted sedimenting basins, so your committee is informed, while in the recent report of the eminent English Engineer, Mansergh, it is laid down as a *sine qua non* to the use of Lake Ontario, that Toronto put in sedimenting tanks and filter beds. The benefits to be deriv-

ed from filtration in such cases is two-fold; First, sanitary by removing such bacterial pollution as that shown in the report on the samples taken at Askin's point and the Walkerville intake; and second, an economic one, by preventing the filling of water mains with mud, thereby reducing their calibre and endangering their tightness as seen in the rising of the Toronto pipe from this cause; and the still more important one of preventing the wear of pumping machinery and engines in the city, and of house taps.

As an illustration of what this pollution means, the following amounts of solid matter were found in samples A. B. C., taken by Engineer Hall from the Detroit river, April 11:

*Analysis of Samples of Water from Windsor. In parts per million.*

	A.	B.	C.
Free Ammonia.....		0.011	0.011
Albumenoid ammonia.....	0.124	0.124	0.124
Nitrogen as nitrates and nitrites.....	0.223	0.221	0.221
Chlorine as chlorides.....	3.0	3.0	3.0
Total solids.....	180.0	178.	180.0

Calculated for four million gallons of water, it would mean that with 180 parts per million there would be nearly two tons of mineral and organic matter pumped into the Windsor pipes every day.

Manifestly, therefore, it is advisable both from the sanitary and economic standpoints, to have effective filtration added to the scheme for taking the common supply of Windsor and Walkerville, above the point of pollution.

Your committee therefore in conclusion, reviewing the history of the Windsor waterworks, since its installation, but especially since 1887; regarding the polluted state of the water, as shown by numerous analyses during the last six years; recognizing the force of the opinions expressed regarding the pollutions in the pamphlet, "Information for the Ratepayers", issued and signed by the Water Commissioners, urging the people to vote money for the pipe to Askin's point, issued in 1893; but especially in view of all the facts which have been brought out in the recent investigation by the Local Board, and in the sworn evidence of 17 witnesses, relating to the recent typhoid epidemic, and its direct connection with polluted public drinking water, begs leave to recommend that the Board under the powers vested in it, under sec. 3 cap. 49, Public Health Act, 1895, do instruct the Councils of Windsor and Walkerville, to jointly take immediate action to establish the intake of their common water supply at a point in the Detroit River, well above the pollution of the river by Walkerville sewage; and that this action be demanded of Windsor to remove the danger from the pollution of her present source, and equally of Walkerville, in order that she be relieved of the present necessity of removing her sewage outfall from the river, and of disposing of her sewage in such other manner as might be designated by this Board; also, that it is strongly advised that for reasons already advanced, the supply be filtered by such means as may be approved of.

All of which is respectfully submitted.

J. D. MACDONALD,  
CHAIRMAN.

PETER H. BRYCE.  
E. E. KITCHEN.  
HARRY E. VAUX.





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## PART III.

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## BELLEVILLE.

### REPORT OF MEDICAL HEALTH OFFICER.

BELLEVILLE, ONT., November 26, 1895.

*To the Secretary Provincial Board of Health :*

SIR,—I herewith present my report for the City of Belleville, for the year of 1895. The sanitary state of the city has very much improved during the past year, a house to house inspection was made by the sanitary inspector and his assistants, and all yards, cess pools and water closets cleaned and disinfected. There has been fifteen cases of typhoid, five cases of scarlet fever and mild form of measles during the past month but not one single death from either scarlet fever or measles. nor has there been during the year a single case of diphtheria in the city. The typhoid fever cases in many instances were contracted from well water owing, in my opinion, to the lowness and want of rain. I ordered some closed up, indeed I think it time that all wells in cities where a city supply of water can be obtained should be closed.

After years of waiting our city fathers have woke up to the necessity of drainage and this year have completed two very important ones. I hope soon to see the whole city thoroughly drained and then with plenty of good water the mortality of the city will become the lowest in the Dominion.

R. TRACY.

M. H. O.

## BRANTFORD.

### REPORT OF MEDICAL HEALTH OFFICER.

*The Chairman and Members of the Brantford Board of Health :*

GENTLEMEN,—I have the honor to present my report on the sanitary condition of Brantford for the year ending October 31st, 1895.

#### *Mortuary Statistics.*

The number of deaths in the city during the year was 255, making the death rate 15.56 per thousand in a population of 16,332.

The death rate in 1894 was 18.03. In 1893 it was 18.83 and in 1892 it was 14.03.

The causes of death were as follows :—

Consumption.....	24
Cholera Infantum and Diarrhoeal affections.....	22
Typhoid Fever.....	16
Diphtheria and Croup.....	15
All other causes.....	178

Fifty were under one year of age ; sixty-nine under five years ; sixty were over sixty years and twenty-three over eighty years of age.

#### *Typhoid Fever.*

There were sixteen deaths from Typhoid fever during the sanitary year, four in November and December, 1894, and twelve during the outbreak this year up to November 1st. The whole number of fever cases reported, including very many however which were extremely mild and brief, was 247.

Compared with recent years we had,

In 1887.....	average per year.....	95 cases.....	10 deaths.
1888.....	".....	".....	"
1889.....	".....	".....	"
1890.....	".....	".....	"
1891.....	".....	".....	"
1892.....	".....	55 ".....	2 "
1893.....	".....	49 ".....	4 "
1894.....	".....	52 ".....	3 "
1895.....	".....	247 ".....	16 "



This wide spread outbreak of Typhoid fever, rivalling in fatality that which prevailed in 1897 and previous years, occurring after several years of comparative immunity was the cause of much anxiety and alarm.

As outbreaks of Typhoid fever are most commonly due to contaminated water either used directly as drinking water or indirectly by means of a contaminated milk supply, the condition of our water supplies became at once a matter of the greatest concern.

These supplies were from two principal sources, the public water supply or city water, supplying over one-half of the population, and private wells, mostly surface wells, supplying the remainder. The idea became prevalent amongst many that contamination of the city water was the cause of the outbreak of fever, and very many families discontinued the use of city water and resorted again to private wells.

Under these circumstances it was a matter of first importance to have a thorough investigation to ascertain the actual facts in relation to the epidemic, and especially to discover whether either or both of our sources of water supply were impure or responsible for it. This investigation was obviously more important as to city water than as to wells, because in the one case a remedy for contamination was possible in the other it was not possible.

We owe the greatest possible thanks to the Provincial Board of Health for the prompt, earnest and efficient way in which they came to our assistance in the investigation, with the invaluable personal aid of the Secretary, Dr. Bryce, and the Bacteriologist and Analyst, Mr. J. J. McKenzie.

The investigation involved on the one hand an inspection of all premises in which fever was reputed to exist to ascertain all the facts bearing on each case, especially the source of water supply, city or well or both, the condition of the wells and their surroundings in relation to contamination, and the source of the milk supply; also an inspection of dairies supplying milk to the city as to their sanitary condition, particularly as to their water supply; also an inspection of everything pertaining to the public water supply, as to possible sources of contamination.

It involved on the other hand chemical analysis and complete bacteriological examinations of many samples of city water and of the various waters of the river, canal and Dead Creek, having a relation to the public water supply. Also bacteriological examinations of various private wells especially of those where fatal or serious cases of fever has occurred.

I have tabulated some of the results of this investigation.

The first table shows the whole number of fever cases reported during the year ending October 31st, and the number using city water and well, in each Ward. Ward No 1 is divided into north and south by the river, so as to show West Brantford separately. Ward No. 2 is divided by the railway into north and south, to show Terrace Hill separately, and Ward No. 5 is divided by the canal into north and south to show Eagle Place separately.

*Table 1.—Fever cases, water used.*

Ward.	Population.	City water takers.	Wells used, 1 to 5.	Fevers reported.	Deaths.	City water used.	Wells used.	Both.
1 N.....	2,211	163	18	18	1	8	9	1
1 S.....	1,371	26	248	11	.....	.....	11	.....
2 N.....	1,126	86	139	56	3	16	33	7
2 S.....	2,340	365	103	37	4	13	22	2
3.....	3,521	602	102	66	4	25	34	7
4.....	2,817	138	425	35	1	5	28	2
5 N.....	1,433	177	109	15	1	2	11	2
5 S.....	1,513	26	276	9	2	.....	9	.....
	16,332	1,699	1,565	247	16	69	157	21

1 South is West Brantford.

2 North is Terrace Hill.

5 South is Eagle Place.

Table 2.—Deaths from Typhoid Fever, water used.

No.	Died.	Name.	Age.	Street.	Water used.
385	November 1, 1894.....	I. R.....	53	169 William.....	Well.
381	" 9, 1894.....	T. O.....	25	197 William.....	"
4	" 19, 1894.....	W. P. R.....	26	Arthur.....	"
10½	December 5, 1894.....	A. M. J.....	22	Eagle Place.....	"
66	July 26, 1895.....	M. E. W.....	39	34 Bridge.....	"
65	August 25, 1895.....	I. T.....	18	7 Joseph.....	"
77	July 30, 1895.....	B. R.....	18	Park ave.....	"
106	August 28, 1895.....	T. H.....	35	Eagle Place.....	"
79	" 8, 1895.....	M. J. B.....	32	40 Nelson.....	"
97	September 3, 1895.....	I. M.....	25	Colborne.....	"
234	October 15, 1895.....	F. C.....	19	Dufferin ave.....	"
159	" 20, 1895.....	R. P.....	56	Terrace Hill.....	"
213	" 19, 1895.....	B. D.....	18	44 King.....	City.
224	" 19, 1895.....	E. N.....	10	Terrace Hill.....	Well.
241	" 23, 1895.....	I. S.....	16	31 Niagara.....	"
227	" 20, 1895.....	G. B.....	20	William.....	"

No. 97, I. M., in the country two weeks just before illness. No. 159, R. P., refused to use city water. Since writing this table have been told that B. D. had malignant diphtheria after typhoid fever.

Table 3.—Showing Milk Supply of Fever Cases.

Milkman.	No. of customers.	No. of fever cases.	No using city water.	Per cent. of fever cases.
Foulds, J.....	309	29	12	9
Bowers Bros.....	135	15	5	11
Rolfson.....	132	10	2	8
Whitham.....	119	7	.....	7
Beel.....	119	42	11	35
Spencer.....	114	8	2	7
Forteus.....	124	13	2	10
Dunsdon.....	103	11	5	11
Snider.....	82	5	2	6
Passmore.....	100	2	.....	2
McEwan.....	99	12	.....	12
James.....	91	9	1	10
Berry.....	92	8	.....	9
Willis.....	88	23	6	25
Frankland.....	65	8	.....	12
Howard.....	76	11	4	14
Birkett.....	75	5	1	7
Cluff.....	60	2	.....	3
Patten.....	17	10	6	59
Lee.....	13	1	.....	.....
Cudmore.....	12	.....	.....	.....
Greenwood.....	.....	9	3	.....
	2,025	240	62	.....

A few used their own cows.

Table two shows that of the 247 cases of fever reported, 69 were reported as users of city water.

Table three shows the source of milk supply of 62 of these cases, of these 62 city water drinkers, 23 had their milk from only three milkmen, and these three had 75 cases of fever amongst their 224 customers. Fifty-one of these city water drinkers had their milk from eight milkmen, who had 152 fever cases amongst their 971 customers.

It has thus been shown that of the sixteen fatal cases of Typhoid fever occurring in one year fifteen were habitual users of well water, from bad and doubtful wells; that of the 247 cases reported, sixty-nine were users of city water, and 176 used well water [twenty-one of them also used city water]. Of the 69 users of city water the source of milk supply of 62 is given in table three, where it is seen that the milkmen supplying them were a comparatively small number having amongst their customers a very large majority of the fever cases. Three milkmen alone having 23 of the 62 cases. Allowing for an uncertain number of cases contracting fever neither by the agency of water or milk but by actual contact with patients, it would be seen that all the cases occurring in Brantford are reasonably accounted for.

Bacteria propagate with extraordinary facility in milk so that a trifling quantity of impure water used in rinsing vessels may be as dangerous as drinking the impure water directly. The wells in the country as well as in town have been unusually bad this year causing much fever in the villages, and the wells of the dairymen have some of them been exceptionally impure. Whether impure water is drunk directly from a private well in the city or taken indirectly by means of milk from a bad well in the country the result may be the same.

It is remarkable that in Eagle Place and also in West Brantford, in both of which districts a considerable amount of fever occurs, two in Eagle Place being fatal, no city water was used at all amongst any of the cases. It is also remarkable that neither in the Ladies College, the Institute for the Blind, nor in any other public institutions where city water is exclusively used has there been a solitary case of fever though the inmates were in large proportion to the ages most susceptible to fever.

In the small villages and amongst the farmers in the county, fever has prevailed in a much greater rate than even in Brantford. No public water supply caused that. *Per contra* in some of our large cities where private wells are almost unknown, and where their public supply has been known to be inferior, no serious outbreak of fever has occurred. Obviously the reason is that though not pure, their waters have been far better than that of wells referred to.

Having regard to all the facts collected and to the various considerations referred to the conclusion seems irresistible without resorting to any bacteriological examination or chemical analysis, that our city water is in no respect to be regarded as responsible for the outbreak of fever in Brantford.

Such examinations have however been made in the most thorough manner by the most competent authority, and have settled conclusively that there have been no impurities in the city water which could be the cause of fever,

In regard to chemical analysis I need hardly repeat my published remarks in my report to the water commissioners, in *re* Dr. Bissell's report, in which I pointed out that all the chemical analysis ever made by any persons from 1885 to 1895 were substantially the same, that there has been no change in the chemical constitution of the water and that therefore such chemical constitution can have nothing to do with our recent epidemic, no matter what opinions may have been expressed about it.

As to the bacteriological examinations, a few were made for the Provincial Board of Health in September by Mr. McKenzie of the University of Toronto, and shortly after seventeen samples were examined by Dr. Bissell, of Buffalo. To these examinations I have already referred. Early in November, examinations of forty-eight samples were made by Mr. McKenzie for the Provincial Board of Health, his report will go to that Board, but he has sent me a copy of the examinations which I annex hereto by permission:—

1. Samples of city water thirty-two from private wells, mostly where fever has been; two from the river; two from the canal and one from Dead Creek.

2. Other samples I have sent to Mr. McKenzie as to which he has not yet reported.

I trust the public will carefully examine the report of these examinations. I can at present only make two or three remarks upon them.

1. A few of the private wells gave fairly good samples with bacteria ranging from 190 to 1,000, comparatively harmless in character, the driven wells generally much better than the pit wells.

2. A large number of private wells show extremely impure samples, pernicious bacteria, ranging from 1,000 to 4,000, and in two or three instances much above that.

3. The eleven samples of city water were in the highest degree satisfactory, bacteria from 40 to 250, averaging 107, harmless in character.

4. River at Dickey's—2,000; at Wilkes' Dam—2,560.

5. Canal—1,350, 1,860, two samples.

6. Dead Creek—3,150.



It will be observed that samples examined by Dr. Bissell, in September, showed the river at Wilkes' Dam at 1,060, compared with Mr. McKenzie's sample in November at 2,560; and Dead Creek by Bissell in September gave 1,420, and by McKenzie in November gave 3,150.

The fact that in November owing to recent rains the river and Dead Creek were dirtier than in September explains that difference, and the fact that in November the ground water was high and the filtering galleries were not sucking from Dead Creek, as they were in September, satisfactorily accounts for the other.

It is plain that the purity of the city water has at times been sensibly impaired by filtration from Dead Creek, and although it may be shown that this has had nothing to do with causing the epidemic of fever, it has yet done much harm by causing hundreds to avoid the city water and revert to wells, many cases of fever we know to have been thus caused; for example No. 159 in table 2 used city water, but when the fever began and doubts were thrown upon it, he refused to use it and thereafter used water from a well which is shown by McKenzie's report to have had 21,000 bacteria per cubic centimetre, and undoubted sewage contamination, the result was death.

I have always urged the necessity of abolishing the Creek. Dr. Bryce although satisfied that fever was not due to it, has in his report recommended it to be abolished, and I am glad to say that by the order of the Commissioners the work is being done under the approval of the Medical Health Officer. About 700 feet in length after being pumped out have been already thoroughly cleaned down to the gravel. The work is to be completed in the spring. Thousands of loads of refuse have been taken out, much of it probably harmless, but some of it extremely offensive. That this objectionable feature of the waterworks system is being abolished and all risks of contamination from that source removed should be a matter of the greatest satisfaction.

Any and all other probable sources of the slightest contamination of our water supply must be jealously guarded against, so as to place it entirely above suspicion, and to secure for it universal confidence.

This being done the public will be less reluctant to abandon private wells, the difficulty in carrying out the recommendations of the Provincial Board of Health in that respect, will be lessened, we will not be likely to be again subject to an outbreak of fever such as occurred this year.

#### *Diphtheria and Scarlet Fever.*

There were fifteen cases of Scarlet Fever reported during the year, none of which were fatal. There were seventy-one cases of Diphtheria and Croup reported, fifteen of which were fatal.

Acting under directions of this Board, I purchased for the use of any physicians desiring it an anti-toxine syringe, and have kept constantly on hand a small supply of anti-toxine, to be sold at cost. Six or seven of the city physicians have availed themselves of this convenience, using the anti-toxine only in cases of great severity. It has been used in some fifteen cases, many of them in great peril and the results have been surprisingly good, only two cases in which it was used have been fatal, and they were in a hopeless condition when it was given. I trust the Board will approve of my continuing to keep a supply on hand and of allowing it free in indigent cases.

The expressed intention of the Governors of the John H. Stratford Hospital to furnish the long-required hospital provisions for cases of Scarlet Fever and Diphtheria, will I sincerely trust at last be carried out, so that we may be placed in a position to give assistance in urgent cases, and to limit the spread of those diseases.

#### *Milk Supply.*

There are at the present time thirty-one licensed milk vendors of milk. There are 672 cows, 572 at present giving in milking and yielding 2,965 quarts per diem. An average additional supply of 449 quarts daily from seventy-five cows is obtained from other dairymen supplying the vendors. It thus appears that about 750 cows are required for this service and that over 3,000 quarts are daily sold in the city. The annual cost of the milk supply of the city exceeds \$50,000. I give here a table showing the results of the last milk testing. These results as will be seen are, with two or three exceptions highly satisfactory, they give a good average of 3.83 of butter fat. Those samples below 3.50 cannot be considered as up to the mark of first-class milk. It is of course not certain that the single sample examined shows the average quality of that particular supply, we only know that the sample was fairly taken from the delivery wagon.

Periodical milk testing is of great importance, securing to us, as our experience proves it has done, an average improvement of about twenty per cent. in the strength of milk representing many thousands of dollars in annual value.



All the herds have this year been examined by a veterinary surgeon and his very satisfactory report is before you. I think in addition to sanitary inspection work that there should be hereafter at least one annual inspection of all the herds by a veterinary surgeon, with a view to guarding against the development of tuberculosis and to the peremptory elimination of all unhealthy cattle. I am convinced that many of the dairymen have been exceedingly lax in reporting affections of their cattle as required by their undertakings, and think that such laxity should no longer be tolerated.

One example within my personal knowledge will suffice to emphasize this point.

Last spring one of the dairymen had a cow which had a swelling of the jaw and appeared not to be in good health, he consulted a veterinary surgeon who declined to operate believing that the disease would return, as the cow was failing in her milk she was sold for a dollar to a butcher. The dairyman says he supposed the carcass was to be fed to hogs. The disease was plainly actinomycosis or lumpy jaw, a dangerous and contagious disease. Whether the animal was fed to hogs or to man, and if to hogs what became of the hogs I have not been able to discover. If the required legal notice had been given all this could not of have occurred. The animal would have been at once destroyed.

The danger of Typhoid Fever being propagated by milk from dairies having a bad water supply, which our experience this year has shown, calls for a more through inspection of dairy premises in future in regard to all their sanitary relations and especially in regard to their water supplies.

#### TABLE OF MILK TESTINGS.

December 4th and 5th, 1895.

	Lactometer.	Butter Fat.	Source of Supply.
Dec. 4th.			
James, W. R. ....	1,033.7	4.40	Steadman & Edmondson.
Foulds, James .....	33.3	3.60	Foulds, Mount Pleasant.
Spencer .....	33.2	4.40	T. Brooks & Son.
Birkett, T. ....	33.6	4.00	Own Supply.
Beal .....	32.1	4.40	Tisdale.
Nelles, R. ....	33.3	4.00	T. A. Secord.
Howard .....	31.9	3.90	John Brittan.
Whitham .....	32.9	3.80	Own Supply.
J. Willis .....	34.7	4.80	Own Supply.
Greenwood, R. ....	31.9	3.20	Own Supply.
Porteus .....	32.9	4.00	Own Supply.
Foulds, N. D. ....	32.9	5.60	Bow Park.
Bowers Bros. ....	32.0	3.30	Kerr.
Bowers Bros. ....	32.9	4.00	Crawford.
Passmore, S. K. ....	32.9	4.40	Own Supply.
Berry, R. ....	32.0	3.80	Own Supply.
Cluff, J. ....	33.1	4.20	Wm. Nunnick.
Dunsdon. ....	30.2	4.00	Robert McEwan.
Dunsdon. ....	32.6	2.80	W. D. Snider.
McEwan, A. R. ....	33.0	4.55	Own Supply.
Rolfson, J. ....	32.6	5.80	Own Supply.
Dec. 5th.			
Rolfson, J. ....	32.6	5.80	Own Supply.
Dunsdon Bros. ....	31.6	3.80	W. D. Snider.
Craddock .....	32.6	3.60	Own Supply.
Foulds, N. D. ....	30.9	6.40	Bow Park.
Patton, John .....	33.17	3.15	Own Supply.
Brittan, William. ....	32.9	4.40	Own Supply.
Cudmore, William. ....	33.7	3.25	Own Supply.
Lee, James. ....	32.6	3.85	Own Supply.

Average Butter Fat 3.83

*Sanitary Inspection.*

Besides the several hundreds of special inspections made on account of the fever epidemic, 1,030 house to house inspections have been made this year.

Two hundred and eighty-six complaints entered at the health office have been investigated and for the most part satisfactorily disposed of. There were sixteen prosecutions before the Police Magistrate, in all of which convictions were obtained. One was fined \$2.00 and costs, five were required to pay \$3.00 costs, and ten were discharged without costs on complying with the requirements of the inspector.

I conclude this report from which I am obliged to omit reference owing to its length, to many important matters, by reminding the Board that we have not yet secured a systematic system of garbage disposal. I have for years urged the necessity for this and have shown how at a moderate expense this service might be effected.

Naturally the expenditure of money for this necessary sanitary work is not as popular as for acquiring beauty spots, or for other æsthetic undertakings. One hundred dollars may be cheerfully paid to ornament the front yard, while a request for five dollars to clean up the back yard meets with no sympathy.

I have the honor to be, gentlemen,  
Your obedient servant,

(Sgd.) E. GRIFFIN,  
Medical Health Officer.

Brantford, December 13th, 1895.

Since writing the above report I have received the report from Mr. McKenzie, of the results of the examination of additional samples of water sent to him. I attach this to his previous bacteriological report.

The samples of river and canal water show a high degree of impurity from 9,760 to 11,178 bacteria to the cubic centimetre. This is to be accounted for by the river being extremely turbid owing to a storm the night before the samples were taken.

It is highly gratifying to see that the samples of city water taken the same morning showed extreme purity, 70 to 120 bacteria to the cubic centimetre.

This forcibly illustrates the great perfection of filtration affected.

(Sgd.) E. GRIFFIN,  
Medical Health Officer.

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HAMILTON.

REPORT OF THE MEDICAL HEALTH OFFICER.

HAMILTON, ONT., 15th November, 1895.

*To the Chairman and Members of the Local Board of Health :*

GENTLEMEN,—I now present my annual report for the year ending on 31st October, 1895. The records received by me have been carefully gone over and show the following statistics :

Our citizen mortality numbers 702. Males, 345 ; females, 357 ; taking our population at 50,000 (which I consider under the mark) the death rate shows 14.4 per 1,000 ; 483 were buried in Hamilton cemetery, 149 in Roman Catholic cemetery and sixty-five of all creeds were taken to other family burial grounds. The total burials in Hamilton cemetery number 615, which includes eighty-nine non-residents and thirty-eight city, still-born.

The records show that fifty-seven deaths occurred at the City Hospital, twenty at St. Joseph's Hospital, three at House of Refuge and one at City Jail. Four citizens died while absent, their remains were brought back for burial. I can only find that five non-residents died in the hospitals. Their bodies were taken away for burial.



There were 229 deaths of children under five years of age, of this number 170 were under one year. The deaths recorded from diarrhoeal diseases seem large, and cannot be attributed solely to excessive heat, our past summer having been very moderate in that respect. Deaths from accidents are also conspicuous.

Contagious diseases reported number 522, as follows : Diphtheria, 138 cases and twenty-six deaths ; scarlet fever, seventy-six cases with nine deaths, and typhoid fever, ninety-four cases and seven deaths ; other infectious diseases number 214.

The mortality from diphtheria has been much less this year than last, because the number of cases have been fewer. The published reports on the efficacy of antitoxine are so conflicting that its value as a curative agent in this disease must yet remain doubtful. One of its remarkable properties seems to exist in its reducing temperature. I think, however, that the temperature in diphtheria reduces too rapidly in many instances without its aid. I have not yet been convinced of its utility.

The accompanying tables illustrate the frequency and mortality of special diseases by months and wards, and also show a comparative table for the previous eleven years. The death column shows the number of deaths of the cases reported each month without reference to time of death.

## BURIAL GROUNDS.

Hamilton Cemetery.							Roman Catholic Cemetery.				Distant Burial Grounds.			Total City Mortality.			City.
1894-95.	Total Burials.	Non-Residents.	Still-born.	Citizens.	Males.	Females.	Citizens.	Males.	Females.	Still-born.	Citizens.	Males.	Females.	Citizens.	Males.	Females.	Total Still-born.
MONTHS.																	
November .....	39	5	2	32	15	17	15	5	10	0	6	2	4	53	22	31	2
December*.....	36	8	1	27	14	13	15	7	8	0	6	5	1	48	21	22	1
January .....	44	9	5	30	17	13	10	7	3	1	3	1	2	43	25	18	6
February .....	46	6	1	39	19	20	15	8	7	0	6	3	3	60	30	30	1
March .....	70	10	7	53	19	34	12	5	7	0	6	2	4	71	26	45	7
April .....	47	4	3	40	21	19	11	8	3	0	6	2	4	57	31	26	3
May .....	60	7	4	49	26	23	6	3	3	0	4	3	1	59	32	27	4
June .....	42	5	5	32	14	18	9	5	4	0	8	5	3	49	24	25	5
July .....	65	12	3	50	25	25	16	9	7	1	4	0	4	70	34	36	4
August .....	63	6	3	54	30	24	7	2	5	2	9	6	3	70	38	32	5
September .....	64	11	3	50	24	26	13	6	7	0	6	1	5	69	31	38	3
October .....	39	6	1	32	13	19	20	13	7	0	1	0	1	53	26	27	1
Totals .....	615	89	38	488	237	251	149	78	71	4	65	30	35	702	345	357	42

## DEATHS BY WARDS AND MONTHS.

Months.	Hamilton Cemetery. Wards.							Totals.	Roman Catholic Cemetery. Wards.							Totals.	Distant Burial Grounds. Wards.							Totals.		
	1	2	3	4	5	6	7		1	2	3	4	5	6	7		1	2	3	4	5	6	7			
November.....	2	2	6	7	2	3	10	32	2	0	1	1	2	7	2	15	0	0	2	1	0	0	3	6		
December.....	1	9	4	5	0	4	4	27	0	4	1	2	3	1	4	15	1	1	0	0	1	1	2	6		
January.....	2	3	4	5	6	7	3	30	0	2	1	1	1	2	3	10	0	0	0	0	2	0	1	3		
February.....	4	5	8	5	4	6	7	39	4	0	2	2	2	4	1	15	1	1	1	0	0	1	2	6		
March .....	3	8	2	5	11	10	14	53	0	2	0	2	2	5	1	12	0	0	2	1	0	0	3	4		
April.....	1	9	5	3	6	3	13	40	0	2	3	1	1	4	0	11	0	0	2	0	0	0	4	6		
May.....	3	3	10	7	6	6	14	49	0	0	1	2	1	2	0	6	1	1	2	0	0	0	4	4		
June.....	1	4	4	6	3	6	8	32	1	0	1	1	0	5	1	9	0	0	1	4	1	2	0	8		
July....	6	7	5	7	3	11	11	50	1	2	0	3	5	2	3	16	1	1	1	0	1	0	0	4		
August.....	4	6	6	8	6	11	13	54	2	1	0	1	0	2	1	7	0	0	3	0	2	2	2	9		
September.....	4	4	10	4	11	4	13	50	0	0	0	5	3	3	2	13	2	1	0	1	0	1	1	6		
October.....	2	3	8	3	0	6	10	32	1	5	1	1	3	7	2	20	0	0	0	0	0	1	0	1		
	33	63	72	65	56	77	120	488	11	18	11	22	23	44	20	149	6	5	14	7	7	8	18	65		
Combined totals of Wards.....									1	2	3	4	5	6	7											
Deaths north of King street.....									are	50	86	97	94	88	129	158	702									
Deaths south of King street.....																										

Estimated population, 50,000. Death rate, 14.4 per 1,000.

## Contagious diseases reported at Health Office, 1894-95.

Months. 1894-95.	Special Diseases.						Unreliable in Numbers.			
	Diphtheria.	Deaths.	Scarlet Fever.	Deaths.	Typhoid Fever.	Deaths.	Chicken Pox.	Measles.	Whooping Cough.	Mumps.
November .....	53	10	3	0	3	0	3	1	4	0
December .....	19	5	4	0	3	0	10	4	8	0
January .....	8	1	12	1	5	0	27	2	17	0
February .....	4	0	13	4	5	0	17	0	4	1
March .....	11	5	8	2	3	3	13	1	8	0
April .....	4	2	4	0	0	0	14	0	5	0
May .....	18	2	5	1	2	0	8	0	4	0
June .....	6	0	5	0	6	0	11	2	12	0
July .....	7	0	5	1	4	0	1	4	17	1
August .....	0	0	4	0	15	0	0	2	5	0
September .....	6	1	5	0	17	1	1	0	5	0
October .....	2	0	8	0	31	3	1	1	0	0
	138	26	76	9	94	7	106	17	89	2

## SPECIAL CONTAGIOUS DISEASES BY WARDS.

	Wards.							
	1	2	3	4	5	6	7	Totals.
Diphtheria.....	19	9	24	21	7	25	33	138
Scarlet fever....	16	16	7	7	1	6	23	76
Typhoid fever...	6	8	14	14	12	18	22	94
Totals by wards..	41	33	45	42	20	49	78	308

## Comparative statement of special contagious diseases for eleven years corrected to date :

Years.	Diphtheria.		Scarlet Fever.		Typhoid Fever.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
1884-85.....	202	59	27	1	52	4
1885-86.....	214	67	109	2	23	2
1886-87.....	205	31	173	2	69	8
1887-88.....	163	48	173	3	127	13
1888-89.....	62	15	151	3	149	12
1889-90.....	45	6	175	6	83	6
1890-91.....	32	8	108	3	69	5
1891-92.....	20	3	135	2	79	10
1892-93.....	55	15	282	2	66	6
1893-95.....	318	69	134	2	120	6
1894-95.....	138	26	76	9	94	4
	1,454	347	1,543	35	933	76



The following is a summary of inspections recorded and work done under the superintendence of your Health Inspectors :

Number of inspections made.....	7,459
Privy vaults cleaned .....	1,449
Privy vaults abolished.....	98
Privy vaults established.....	35
Cesspools cleaned .....	17
Earth closets notified to clean.....	42
Sewer connections made on notice.....	19
Sewer connections found defective and repaired .....	106
Foul and offensive drains abolished.....	53
Stagnant water abolished .....	18
Dirty premises cleaned .....	28
Other nuisances abated.....	595
Houses placarded for infectious diseases .....	158
Houses properly fumigated.....	159
Scavenger work—Loads delivered at dumps.....	6,770
Dead animals burned at crematory—Dogs .....	281
“ “ “ “ Cats .....	237
“ “ “ “ Chickens .....	250
“ “ “ “ Goat .....	1
Lots of meat burned at crematory.....	14
Lots of fish burned at crematory.....	21
Loads of rags, etc., from the City Hospital.....	58
Bedding and clothing from infectious houses .....	13
Milk licenses issued .....	244
Samples collected and tested.....	1,396
Cow byers, dairies and shops inspected .....	825
Number of cows reported dirty .....	2
Premises reported dirty.....	2

All of which is respectfully submitted,

I. RYALL, M. H. O.

## KINGSTON.

### REPORT OF THE MEDICAL HEALTH OFFICER.

To the Chairman and Members of the Local Board of Health :

GENTLEMEN,—In accordance with the requirements of the Public Health Act I have the honor to submit my annual report on the sanitary condition of the City during the year ending December 31st, 1895.

#### *Infectious and Contagious Diseases.*

The record of the cases of typhoid fever show a considerable decrease in the number as compared with former years. The number of cases reported was 35. The decrease is no doubt attributable to the intake of the water supply pipe having been located out in mid-stream, where the purest water from Lake Ontario is procured. Another cause is that a large number of wells are being filled in annually, the citizens, now that cheap rates have been afforded, practically recognizing the fact that pure water is a great factor in the preservation of health and the prevention of disease.

#### *Diphtheria.*

The number of reports of this disease is larger than that of 1894. The cause, I think, may be principally ascribed to the dry season, and the large increase in the number of house water-closets emptying into the old stone drains. These sewers are simply receptacles or reservoirs for the collection and fermentation of excrement, and therefore propagate, and permit to escape into the air of the city, germs of disease. I am gratified, however, to be able to report that while the cases of diphtheria have been unusually numerous, the disease has not been of a virulent or malignant type. The percentage of deaths was small. Number of cases seventy.

*Scarlet Fever.*

This disease was very mild and of a sporadic character. It was not localized, but scattered in different sections of the City. Number of cases, 17 ; no deaths.

*Membranous Croup.*

Although the law does not require reports of this disease to be made, the Local Board of Health, in its wisdom, thought the matter of such importance that it passed a resolution instructing all medical men in the city to report the cases of membranous croup that came under their notice, so that a record of them could be kept. There were fifteen cases reported, and the death rate was very great.

*Measles.*

Only three cases were reported, and none proved fatal.

*The Ice Supply.*

It is worthy of note that our Local Board of Health, at its last meeting passed a resolution to the effect that hereafter no persons will be permitted to cut ice, no matter for what purposes, domestic or cooling, within the line laid down by the Board. The ice must be obtained from where the purest water is known to exist.

*Sewage.*

The disposal of sewage is a matter of great moment to the health of the city. I look forward to the time when funds will be available for the replacing of the old stone drains with tile pipes, and either the construction of an intercepting sewer along the front of the City, so that the sediment or sludge could be collected and buried, or the conveyance of the sewage through a large iron pipe into deep water, where the heavier matter would soon settle and its deleterious character be gradually reduced beyond detection.

*Slaughter Houses.*

There are only two recognized slaughter houses in the City, and they are located at a considerable distance from any dwellings. However, for the better protection of the public health, I would recommend the establishing of an abattoir.

SAMUEL H. FEE, M.D.,

Medical Health Officer.

## LONDON.

## REPORT OF MEDICAL HEALTH OFFICER.

*To the Chairman and Members of the Local Board of Health :*

GENTLEMEN,—During the year we had a death rate of 11.2, the city's population, according to the assessment returns being 34,429. "This is the lowest rate yet reached by the city and will in all likelihood be lower than that of any other city in Canada. If the deaths among the city residents alone were counted however," "the rate would be still further reduced, for it must be remembered that many come to the city to avail themselves of the treatment offered at the hospitals. For instance, seventy-five per cent. of the persons treated for typhoid fever at the General Hospital were non-residents."

Ninety-nine cases of infectious diseases were reported at the health office inclusive of those sent to the City and St. Joseph's Hospitals, compared with 215 last year. Classified they were as follows : Typhoid fever, 63 ; diphtheria, 23 ; scarlet fever, 13—a marked decrease in preventable diseases compared with former years. The infectious diseases during the year were of mild types. Scarlet fever is not credited with any deaths, while typhoid fever is given as the cause of only eight, and diphtheria of three. Consumption heads the list (as it always does in temper-

ate bones) with 38 deaths; heart disease and "heart failure" (which describes nothing at all) caused 30 deaths; pneumonia, or inflammation of the lungs, comes next with 26, and 24 are accredited to old age. Paralysis caused the death of 18, and cholera infantum 16. There were 16 violent deaths, a surprisingly large number as compared with other years. Cancer caused 17; apoplexy and inflammation of the bowels, 14 each; convulsions, 11; diarrhoea, croup, tubercular-meningitis, 10 each; Bright's disease, la grippe, dropsy and bronchitis, 7 each; marasmus 6; inflammation of the brain 5; indigestion and dysentery 5 each; blood poisoning, jaundice and diabetes, 4 each; whooping cough and enteritis, 3 each; inflammation of the stomach, infantile debility, abscess, spinal meningitis, obstruction of the bowels and premature birth, 2 each; and one each from a number of other diseases.

A great deal of sanitary and other work has been done during the year. Many complaints have been received and attended to. Thirteen wells have been closed and 23 caused to be cleaned, and it was gratifying to know that the city water was gradually taking the place of dangerous wells. Many of the public schools had been inspected, and a careful inspection has been made of all the city stores where girls and women are employed, a report of which has been made to the City Council. The house to house inspection was completed on the 26th of May. The inspectors reported as follows:

Premises visited, 7,252; closets reported not clean, 1,630; yards reported not clean, 335; cess-pools reported not clean, 32. Subsequent visits were made by the assistant inspector to see that cleaning was properly done, and before the hot month of June set in the City was in good sanitary condition.

A careful inspection has also been made of meats, fruit, etc., offered for sale upon the market. The city's ice supply is still taken from the north branch of the Thames, in accordance with the regulation of the board, the water having been found upon analysis to be better than that of the cove or south branch. Ice taken from the two latter places is allowed to be sold for cooling purposes only. The very important matter of house plumbing has year by year been urged upon the attention of the City Council, but so far nothing has been done towards compelling builders and owners to put in plumbing that will not endanger the occupants. Two recent deaths in the city can be traced to no other cause than defective plumbing, and it is hoped that no further delay will be made in a matter of such vital importance to the people. A competent plumber should be appointed to see that no more of this wretched plumbing is put into dwellings.

(Signed)

T. V. HUTCHINSON,  
Medical Health Officer.

OTTAWA.

#### REPORT OF THE MEDICAL HEALTH OFFICER FOR 1895.

*To the Chairman and Members of the Board of Health:*

GENTLEMEN,—I beg leave to lay before you the annual report of the Health Department for the year ending 31st October, 1895.

In so doing it may be satisfactory to know that notwithstanding the prevalence of epidemic diseases, such as diphtheria and scarlet fever, in the city during the first half of the period comprised in this report, the death rate from all causes was less than that of the previous year. The total mortality for the past year was 1,083, which with our estimated population of 52,000, gives us a death rate 20.82 per thousand; 416 of the total deaths were children of five years and under.

It is no doubt due to the incessant efforts of the registrar of this division to enforce compliance with the requirements of the law in this respect that the registered mortality, in so far as numbers are concerned, is approximately correct; but at the same time I very much regret to say



that, as records of the causes of death these statistics are misleading, and will have but little of the scientific value they should have, so long as burials are permitted without a physician's certificate as to the cause of death. It is true, no doubt, that sporadic cases of infectious diseases we must inevitably have always among us, but it appears quite evident, as recorded on table No. 4 here attached, that the death roll of these so-called preventable diseases for the past year is much larger than it should be. Admitting as a fact that these diseases, in the great majority of instances, are spread by personal infection, it is also safe to affirm that here, as elsewhere, they generally have their first causation in unsanitary conditions of the dwelling house or its immediate surroundings or both. This has been painfully exemplified in the southern and south-western sections of the city, where drainage is sadly needed, and where these diseases, especially diphtheria and scarlet fever, prevailed extensively.

That during the past year the isolation hospitals have done good work is self-evident, as indicated in table No. 2 here attached, showing the number of patients treated there during the year as well as the deaths therefrom.

The infectious diseases reported at the Health Office during the year were as follows :

	cases.
Diphtheria .....	287
Scarlet fever .....	182
Typhoid fever.....	195
Measles .....	23
Whooping cough .....	27
Total.....	713

NOTE.—The figures recorded here opposite the three first named diseases I believe to be about correct. I cannot, however, say as much to the others. Measles and whooping cough, I am inclined to think, in many instances are not reported.

The milk consumed in the city is supplied by about seventy-five licensed vendors from dairy farms in the surrounding country, and the fact that there was but one single complaint made at the Health Office during the past year against the article supplied, seems evidence enough that the milk supply of Ottawa is undoubtedly good.

The ice of the city for household use is taken entirely from the Ottawa river above the Chaudiere Falls, and the regulations of your Board relating thereto have, during the past year, been willingly complied with by the ice vendors of the city.

For a few years past one of the most perplexing questions to a very large number, if not the majority of the householders of this city, has been how to dispose of household refuse.

This, especially during the summer season, becomes a very serious matter in a sanitary point of view, and has been a prolific source of complaints and recriminations against the Board of Health in not organizing a proper scavenging system. There is no doubt that Ottawa has now arrived at such proportions as would urgently demand better methods than those now in use for the final disposal of such matter.

The details of the work done in the sanitary department during the past year are fully shown in the sanitary inspector's report here appended, to which I beg to refer you.

In conclusion I wish to express my satisfaction at the assistance given me by the sanitary inspector and his assistant in carrying out the work of this department, and acknowledge with pleasure the aid given by the police in the work of general sanitation.

Respectfully submitted,

10th January, 1896.

A. ROBILLARD, M.D.

Table No. 1.—Showing the number of patients treated in the hospitals for contagious diseases and deaths resulting therefrom for year ending 31 October, 1895.

Diseases.	Protestant Annex.				Roman Catholic Annex.			
	Remaining from last year.	No. admitted.	No. cured.	Deaths.	Remaining from last year.	No. admitted.	No. cured.	Deaths.
Diphtheria .....	11	111	111	11	11	199	182	28
Scarlatina .....	6	50	48	8	1	40	37	4
Measles .....	.....	2	2	.....	.....	1	1	.....
Totals .....	17	163	151	19	12	240	220	32

Table No. 2—Records of the House of Bethlehem for the year ending 31 October, 1895.

		Totals.
Infants in Asylum Nov. 1st, 1894.....	14	
" admitted during the year .....	222	236
Returned to parents or placed out .....	105	
Died during the year .....	118	
Remaining on Nov. 31st, 1895.....	13	236

Table No. 3.—Showing the death rate per thousand per annum from Zymotic diseases as compared with total death rate in the city during the past eight years.

—	Population (estimated).	Zymotic diseases.								Zymotic.		All causes.		
		Smallpox.	Measles.	Croup.	Scarlet fever.	Diphtheria.	Typhoid fever.	Puerperal fever.	Diarrhoeal diseases.	Others.	No. of deaths.	Rate per thousand.	No. of deaths.	Rate per thousand.
1887.....	38,000	.....	2	2	.....	36	15	.....	150	6	207	5.23	778	20.47
1888.....	40,000	.....	2	2	.....	62	46	.....	166	9	283	7.07	915	22.97
1889.....	43,000	.....	13	19	5	59	18	2	188	17	321	7.46	983	22.86
1890.....	44,000	.....	4	13	4	39	19	4	160	25	265	6.02	960	21.81
1891.....	45,000	.....	6	14	24	30	9	3	203	21	310	6.88	908	20.17
1892.....	46,000	.....	16	7	4	15	13	.....	.....	13	68	1.46	983	21.13
1893.....	48,000	.....	5	6	5	17	16	3	158	29	239	4.97	892	18.58
1894.....	50,000	.....	5	41	23	78	17	1	195	33	393	7.86	1,083	21.66
1895.....	52,000	.....	9	15	33	80	15	2	249	.....	403	7.75	1,083	20.82

NOTE.—As shown in the above table, the average death rate from all causes in Ottawa during the past ten years has been 21.68 per thousand of the population.

## REPORT OF SANITARY INSPECTOR.

Health Office, City Hall,  
OTTAWA, 24th December, 1895.

*The Chairman and Members of the Board of Health :*

GENTLEMEN,—I have the honor to submit for your consideration the annual report of the Sanitary Department for the year ending 31st October, 1896.

In presenting this, my eighth annual report, it is gratifying to be able to report marked improvements in the manner in which the contractor for the removal of night soil has carried out his work. I am also pleased to report on the satisfactory manner in which the assistant inspectors have performed their duties. In respect to the removal of garbage, the absence of any organized system leaves this part of my work in a very unsatisfactory condition ; the treatment, however, of such garbage when removed to the several dumping grounds has been successful and without complaint.

*Disinfection.*—Two hundred and twenty-six houses were fumigated and cleansed ; eighty-seven houses were placarded for infectious diseases ; ninety-six cards were removed from infected houses.

NOTE.—The above include only those attended to by myself.

*Plumbing Tests.*—One hundred and twenty houses were tested for the discovery of defects in draining and plumbing systems.

*Prosecutions.*—Four proprietors of dwelling houses were summoned for contravention of the Public Health Act, and convictions secured.

In so far as the work of the Department can be put in form, the following tables show what has been done.

I am, Gentlemen,  
Your obedient servant,  
GEO. McNEILL,  
Sanitary Inspector.

Table No. 1.—Classification of Nuisances coming under the notice of the Department during the year.

Description of Nuisances.	By whom reported.					Total.
	Sanitary staff.	Tenants.	Neighbors.	Owners.	Others.	
Accumulations of manure, etc., on lots .....	32	6	41	7	7	93
Cellars flooded and otherwise polluted .....	58	88	9	.....	.....	155
Drains choked and otherwise defective .....	37	49	4	7	.....	97
“ box .....	6	9	.....	.....	1	15
“ none .....	14	13	.....	3	.....	30
Dwellings unfit for habitation .....	5	2	1	.....	.....	8
“ dirty and unwholesome .....	12	.....	6	2	.....	20
“ sewer gas escaping into .....	36	87	.....	.....	.....	123
Foul yards and premises .....	503	.....	321	13	207	1,044
Illuminating gas escaping on streets and into dwellings .....	7	23	.....	1	.....	31
Privy vaults of defective construction .....	41	10	6	.....	.....	57
“ too near dwellings .....	2	.....	7	3	.....	12
“ want of .....	1	1	.....	.....	.....	2
Pigs kept too near dwellings .....	.....	.....	5	.....	1	6
Sinks untrapped and defective .....	4	2	.....	.....	.....	6
“ want of .....	1	3	.....	.....	.....	4
Soil pipes unventilated .....	5	3	.....	.....	.....	8
“ untrapped .....	5	5	.....	.....	.....	10
“ otherwise defective .....	13	9	.....	.....	.....	22
Waste pipes defective .....	20	12	.....	.....	.....	32
Water closets of defective construction .....	9	8	.....	.....	.....	17
“ unventilated .....	4	.....	.....	.....	.....	4
Want of water for domestic purposes .....	.....	16	.....	.....	.....	16
Miscellaneous .....	4	.....	.....	.....	11	15
Totals .....	818	346	400	36	227	1,827



Table No. 2.—Statutory notices issued during the year.

	To proprie- tors.	To tenants and others.	Written.	Verbal.	Totals.
November, 1894 .....	38	40	25	53	78
December, " .....	22	13	17	16	35
January, 1895 .....	29	75	34	70	104
February, " .....	20	64	21	63	84
March, " .....	18	21	16	23	39
April, " .....	20	68	18	70	88
May, " .....	48	194	42	200	242
June, " .....	60	132	61	131	192
July, " .....	35	77	30	82	112
August, " .....	55	98	48	105	153
September, " .....	24	87	23	88	111
October, " .....	39	53	28	64	92
Totals.....	408	922	363	967	1,330

Table No. 3.—Privy vaults emptied and revenue to contractor therefrom during the year.

	Upper Town.		Lower Town.		Total.	
	No. of privies.	Amount.	No. of privies.	Amount.	No. of privies.	Amount.
November, 1894 .....	205	\$ c. 291 05	169	\$ c. 204 30	374	\$ c. 495 35
December, " .....	283	393 54	290	367 60	573	761 14
January, 1895 .....	206	279 65	248	300 75	454	580 40
February, " .....	222	303 95	198	281 10	420	585 05
March, " .....	189	278 50	206	277 55	395	556 05
April, " .....	255	363 20	170	208 01	425	571 21
May, " .....	216	316 60	201	225 14	417	541 74
June, " .....	56	97 70	43	45 40	99	143 10
July, " .....	33	93 00	28	54 95	61	147 95
August, " .....	16	17 23	13	15 60	29	32 83
September, " .....	23	26 50	21	21 90	44	48 40
October, " .....	75	105 64	118	155 15	193	260 79
Totals.....	1,779	2,566 56	1,705	2,157 45	3,484	4,724 01

Table No. 4.—Location of nuisance and number on each street.

Street.	Number of nuisances.	Street.	Number of nuisances.	Street.	Number of nuisances.
Albert .....	25	Frank .....	2	Ottawa .....	26
Anglesea Sq. ....	11	Florence .....	9	Osgoode .....	9
Archibald .....	9	Flora .....	5	Oregon .....	3
Anderson .....	8	Gloucester .....	26	O'Connor .....	18
Ann .....	22	George .....	24	Papineau .....	2
Augusta .....	24	Gorve .....	2	Parliament .....	1
Alice .....	11	Gilmour .....	16	Portland Ave. ....	1
Arthur .....	10	Head .....	4	Peter .....	6
Bay .....	16	Henderson .....	2	Primrose .....	2
Baird .....	9	Hill .....	14	Percy .....	1
Bell .....	4	Isabella .....	15	Pinard .....	1
Besserer .....	12	John .....	2	Pine .....	8
Bridge .....	16	James .....	10	Pine (N. E.) .....	3
Bolton .....	10	Kent .....	26	Preston .....	12
Boteler .....	23	Keefer .....	2	Poplar .....	2
Bank .....	37	King .....	35	Perkins .....	6
Broad .....	16	Lisgar .....	29	Queen .....	17
Britannia .....	9	LeBreton .....	10	Queen West .....	9
Balsam .....	11	Lewis .....	16	Rochester .....	6
Cambridge .....	10	Lett .....	9	Rideau .....	26
Cathcart .....	12	Lochiel .....	3	Russell Ave .....	2
Cartier .....	9	Lloyd .....	2	Rose .....	2
Crawford .....	7	Lyon .....	4	Redpath .....	3
Cedar .....	11	Lorne Ave .....	5	St. Andrew .....	29
Church .....	14	McGee .....	5	St. Joseph .....	3
Concession .....	21	McLaren .....	16	St. Patrick .....	24
Cobourg .....	15	Metcalfe .....	24	Sparks .....	33
Canal .....	10	McDonald .....	4	Stewart .....	11
Cumberland .....	48	McDougal .....	6	Sophia .....	3
Clarence .....	29	McLeod .....	1	Sussex .....	37
Cooper .....	17	McKay .....	4	Somerset .....	11
Creighton .....	7	McTaggart .....	5	Slater .....	17
Charlotte .....	2	Maria .....	16	Sherwood .....	6
Chapel .....	22	Murray .....	5	Spruce .....	5
Currier .....	3	Maple .....	3	Stanley Ave .....	3
College Ave .....	8	Marlborough .....	1	Theodore .....	17
Charles .....	10	Middle .....	8	Turner .....	12
Cliff .....	3	Mutchmor .....	3	Victoria .....	3
Daly .....	21	Mosgrove .....	2	Victoria Ave .....	5
Dalhousie .....	41	Martineau .....	4	Water .....	17
Division .....	37	Munro .....	4	Waller .....	13
Dufferin .....	7	Market (W. W.) .....	7	Waverly .....	1
Duke .....	26	Market (By W.) .....	3	Wellington .....	47
Elgin .....	14	Market Cathcart .....	2	Wilbrod .....	13
Eccles .....	1	Nelson .....	3	Willow .....	12
Emily .....	4	Nepean .....	8	York .....	10
Elm .....	4	Nicholas .....	5	Other places .....	186
Ellen .....	12	Neville .....	3		
Friel .....	16	Notre Dame .....	5	Total .....	1,827

All of which is respectfully submitted,

GEO. McNEILL,  
Sanitary Inspector.

## ST. CATHARINES.

## REPORT OF CHAIRMAN.

*To the Mayor and Aldermen of the City of St. Catharines :*

GENTLEMEN :—In compliance with the Act relating to Local Boards of Health, I herewith submit the annual report of your Local Board for year ending in November, 1895.

The subject matter is very brief, owing to the fact of there being nothing of any particular interest to report upon, outside of what is contained in the report, herewith submitted by your City Clerk.

We have every reason to congratulate ourselves and the citizens generally, that there has been no epidemic of disease, and the City has been and is at the present time in a good healthy state.

No extraordinary expenditure has been required.

The Sanitary Inspector has attended to his duties I believe in a satisfactory manner, very few complaints have been made to the Board, and the Inspector has always been prompt in looking after them.

The total deaths as per report of City Clerk is fourteen, I find after deducting eight for old age, two suicides, and still born ten, the death rate of the City would be 12 per 1,000.

Respectfully submitted,

SAMUEL G. DOLSON,

Chairman.

St. Catharines, Nov. 15th, 1895.

*To the Chairman and Local Board of Health of the City of St. Catharines :*

GENTLEMEN,—Herewith I have the honor to submit the annual statement of the number of deaths in the City of St. Catharines, from Nov. 15th, 1894, to Nov. 15th, 1895, and the causes thereof, also statement of the number of contagious diseases for the same period as per medical returns.

## Deaths.

Disease.	Number.	Disease.	Number.
Lung disease .....	4	La grippe .....	1
Pneumonia .....	8	Cancer .....	3
Congestion of brain .....	4	Poisoned .....	1
Paralysis .....	7	Measles .....	1
Still born .....	10	Diarrhoea .....	2
General debility .....	2	Indigestion .....	4
Diabetes .....	1	Cholera morbus .....	1
Heart disease .....	19	Hip disease .....	1
Liver complaint .....	1	Typhoid fever .....	1
Injuries .....	3	Burned .....	1
Varicose ulcer .....	1	Bright's disease .....	2
Apoplexy .....	2	Peritonitis .....	3
Consumption .....	17	Marasmus .....	2
Bronchitis .....	11	Cholera infantum .....	9
Inflammation of spleen .....	1	Inflammation of bowels .....	3
Epilepsy .....	1	Cerebritis .....	1
Suicide .....	2	Puerperal fever .....	1
Croup .....	2	Drowned .....	1
Meningitis .....	2	Dropsy .....	1
Gangrene .....	1		
Old age .....	8	Total .....	141
Convulsions .....	2		



*Contagious Diseases.*

Reported.	Number.	Deaths.	Number.
Scarlet fever .....	20	Measles .....	1
Typhoid fever .....	10	Typhoid fever .....	1
Diphtheria .....	3		
Measles .....	5		
Total .....	38	Total .....	2

I have the honor to be,

Your obedient servant,

J. ROLLISON,

Secretary.

City Clerk's Office, St. Catharines, December 8rd, 1895.

ST. THOMAS.

REPORT OF SANITARY INSPECTOR.

ST. THOMAS, 5th December, 1895.

*P. H. Bryce, Esq., M.D., Secretary Provincial Board of Health :*

DEAR SIR,—Complaint has often been made to me by individuals and by members of the W.C.T.U. that there is no provision made for the accommodation of female employees in stores and shops in this city for necessary purposes and on that the health of many is endangered if not impaired.

I visited the various places and reported the facts to the Local Board of Health which body is anxious to improve the condition of the employees. The Board instructed me to consult the city solicitor as to the power allowed us in such cases.

The solicitor informed me that the Public Health Act gives power to regulate things that do exist but does not give power to require the construction of closets etc., where they are not already.

In most cases the owner of the property is not willing to make the necessary provision but when the owner is also the person conducting the business I found a willingness to do what is right in the matter.

The city solicitor was of the opinion that the question was one for the Inspector of Factories.

I take the liberty to bring the matter to your notice in the hope that something may be done for those who now suffer, as it is for the benefit of the public health we are working.

I am yours truly

W. J. SHAW,

Sanitary Inspector.

## TORONTO.

BY CHARLES SHEARD, M.D., MEDICAL HEALTH OFFICER.\*

TORONTO, November 26th, 1895.

*To the Chairman and Members of the Local Board of Health :*

GENTLEMEN,—I have the honor to present the final report for the departmental year 1894 and 1895, being supplementary to the monthly statements already submitted, and a more or less complete summary of the year's work. I have in a former report referred in detail to the methods of quarantine and disinfection adopted by the Medical Health Department of the city of Toronto, which methods have been thoroughly and rigidly carried out during the past year, and in the description of which I need not here occupy space, as I have already fully dealt with them.

The character, condition and arrangement of plumbing work and drains becomes a matter of considerable interest and importance in discussing the question of the etiology of contagious diseases. It is a matter of question whether or not defective plumbing and drains can be considered as actual and exciting causes in the production of either typhoid fever or diphtheria, but, in my opinion, they can operate as predisposing causes.

As to diphtheria itself, there can be little doubt in the mind of anyone who would take a large number of cases, and carefully and thoroughly investigate the source of contagion, but that there is every reason to believe that they spread in all cases by direct contact or direct contagion ; but, notwithstanding these facts, every physician knows, and every sanitarian admits, that certain constitutional and systemic states render one individual susceptible, or vulnerable, and another insusceptible, or invulnerable, to the specific virus ; and, as a cause of vulnerability, sewer gas inhalation takes a potent and formidable place.

Coming to the question of plumbing and drainage, as it affects dwellings in a city having a more or less complete and thorough sewerage system, the first point raised is, what are the important points to be considered and watched in a plant so susceptible to disorders and thermal changes as house drains and plumbing are in a country like Canada, where frosts are sudden and severe ? Reviewing the plumbing reports of the Medical Health Department of the city of Toronto for the last two years, which include smoke tests, the weak points appear to be, first, in the drains, where the soil-pipe and drain are joined, or where the drain passes through or under the walls of dwellings. A defect frequently found upon applying the smoke test to the plumbing work and drainage systems of a dwelling is a leak at the junction of the soil-pipe with the drain. This has been brought about, in the majority of instances, by the settling of the iron soil-pipe—the weight of which is considerable, in an ordinary three-storey building, and especially so if it be not properly supported—and the settling of the walls of the building. This would present to one's mind the necessity for a substantial support being placed under the soil pipe and drain connection, which support ought to be of brick, stone or concrete, so arranged as to prevent settling, and also of a shape such as would effectually support the rounded bend which is commonly used at this particular point. This, together with proper hangers, would be in a measure a preventative of the accident referred to.

The next point is the best means of maintaining the integrity of a drain where it passes under or through a wall, the danger here being, of course, from the settling of the wall, which may result in the destruction of the drain pipe at that point, or its detachment at some point adjacent. In this connection a proper stone or concrete footing for the wall becomes all-important, and a due regard as to the nature of the soil, as to its sandiness or springiness, must receive careful consideration. The footing to the wall must also be of such a proportion as to properly support it. The point through which the house drain passes could well be strengthened by a properly constructed arch of brickwork, or protecting the same by a stone sill set immediately above the drain, guarding the aperture for the drain in the same manner as any other aperture in the wall.

It is no very uncommon occurrence to find that while the drain has been tested, when open, with the water test, and afterwards filled in, and the smoke test applied, say a few weeks or months afterwards, defects in the drain are found which may occasion considerable surprise, and these defects may not be the result either of the settling of the wall, or of the settling of the soil pipe connections, but may occur at any point in the continuity of the drain. Assuming that the drain was carefully laid and properly inspected, the breaking of the collar of the tile pipe, or the defect in the drain, may result from the drain being improperly laid, so that the pipe is supported only at points where the collar of the pipe exists, and the weight of earth pressing

\*These are excerpts only from the Annual Report which appears in printed form.



upon the intervening portion being sufficient to either break the pipe or the drain connections. Of course it is understood that I am now referring to other forms of drainage than iron drains. It might be argued that the substitution of iron drains throughout would be sufficient to at once remove all possibility of such defects, but such a suggestion often cannot be adopted because of the expense incurred; and furthermore, experience may show that the iron drain is susceptible to changes from the chemical action of the sewage passing through it, and by permitting accumulations, deposits and corrosions in it which will seriously reflect upon its sanitary integrity; also in making connection in iron drains the porcelain lining of soil pipe may be easily injured.

As to the trap on the house drain, the object of the same is, of course, to prevent the sewer from being ventilated through the dwelling, and in cases where there are iron drains throughout it is argued that the main trap ceases to be a necessity. If, however, galvanized iron or tin conductor pipes run into the drain, as is customary with us, these in their turn become drain ventilators and are particularly prone to be defective at their seams and bends due either to corrosion or the influence of frost; the main trap of the drain, under such circumstances, becomes a necessary safeguard.

As to inside work, passing over the defects resulting from gross carelessness, either of workmanship or inspection, such for instance as leaving unclosed the connections or cleaning screws and hand holes, without their proper caps or coverings, the soil pipe demands particular attention. First, as to the hangers being placed directly under the collars of the soil pipe joints, and properly secured by screws to the wall, and so placed to be as little amenable as possible to the influence of frosts. The object aimed at is that of preventing traction upon the joints, which readily become imperfect and, in consequence, leaks of a serious character may occur at such points. In order to obviate the effect of the weight of the entire length of soil pipe from pressing upon the drain connection, or its vicinity, a stool of masonry work might with advantage be placed at the junction of the soil pipe to the drain.

Again, the floor flange connections of closets to drains are important, and being below the closet trap, when defects exist, may serve to ventilate the drain into the closet apartment, to overcome with a properly secured screw joint, with screw bolts and rubber packing, should in all cases be made. Very frequently, however, the joint is loosely run with cement, putty, or even mortar, where, with the working of the closet and the settling of the building, the joint speedily becomes defective. A point which is often overlooked, in the construction of water closets, is the proper position and arrangement of the seats, which, by being too far forward or too high up in relation to the bowl, permit of the urine escaping on the safe (or lead covering of the floor immediately underneath the closet); the safe thus becoming covered with urine is speedily corroded and becomes extremely foul and offensive. We might also remark that the space under the closets is not intended as a storeroom for every objectionable substance which a house may contain, but it is intended to be kept with the same care as the closet itself, and in order to avoid depositing an accumulation of refuse, and the neglect which follows such deposit, a finished closet should be supplied with an apron, the work below being open for ventilation and inspection.

In connection with the ventilation of the closet, special mention is to be made of the necessity for a local vent from underneath the seat of the closet, and into the kitchen chimney flue, or other flue constantly in use. The local vent may be of galvanized iron, the seams and connections of which should be carefully and properly made.

### *Diphtheria.*

A careful study of the subject of diphtheria strengthens the conviction that one of the most important points in connection with the disease is the avoidance of the danger of infection. With this object in view, it becomes a matter of importance to diagnose the disease at the earliest possible moment in order that prompt measures of importance may be adopted, and also it is important to determine when quarantine regulations may, with safety, be discontinued.

Having this object in view, the Medical Health Department of the city has, since the beginning of February last, made arrangements for the bacteriological examination of all cases of diphtheria, whether doubtful or determined. Sterilized swabs are supplied to practitioners, which, on being returned to the Medical Health Department, are examined microscopically and cultures made therefrom, the results of such examination being communicated as soon as possible to the medical attendant.

It is scarcely necessary to point out the value and importance of such work, as in ordinary non-specific cases it removes almost at once the element of doubt, and, in many cases determines, prior to the formation of membrane in the throat, and before the development of characteristic *clinical symptoms*, the existence of the disease. A moderately large number of cases can be



thus examined without the enormous degree of work which at first glance would appear necessary to the undertaking, and brings the comparatively modern revelations of bacteriology within the application of many who may not have the necessary skill or requirements for such work, and which methods, upon becoming more thoroughly understood, will be more universally applied with invaluable benefit to the community.

In addition to this, a bacteriological examination of the throat shows when the danger of communicating the disease to others, either occupants of the same house or not, ceases to exist.

Cases occasionally occur where diphtheritic bacilli find a lodgment upon the mucous membrane of the throat, and grow and propagate there to a limited extent, and yet show comparatively little clinical evidence. From a cursory examination of the throat one would be inclined to conclude the absence of danger from infection, but a bacteriological examination would reveal the presence of the bacillus in the saliva and throat exudations.

Bacteriological work applied to an institution for the cure of diphtheritic cases becomes a matter of the greatest importance. Not only does it prevent the possibility of a doubtful case being sent directly into a diphtheritic ward to become subsequently infected, but it also prevents the retention of non-diphtheritic cases in an institution where diphtheria exists, and also saves the cost of their maintenance.

In addition to this, it enables one to state positively when a patient who has passed through the various stages of diphtheritic trouble can be safely allowed to go home and mix with the public without danger from infection.

I may say that so far as the Isolation Hospital is concerned no patient is admitted to the diphtheritic ward until the case has been proven bacteriologically to be one of diphtheria, nor is the patient allowed out of the Isolation Hospital until the bacteriological examination of the throat has proved the absence of the infecting germ.

The results of our investigations in connection with diphtheria has been to draw attention to the school as the great distributing centre, nor do I entertain the opinion that the sanitary condition of the school is often to any great extent causative, but the school must be regarded as the focal point of distribution, and when diphtheria exists in a thickly populated locality the necessity of closing the school, even in the absence of cases of diphtheria presenting themselves in its classes, may, under such circumstances become apparent.

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## WINDSOR.

### REPORT OF THE MEDICAL HEALTH OFFICER.

*To the Chairman and Members of the Local Board of Health :*

GENTLEMEN,—You are aware that I was not appointed Medical Health Officer until July 3rd, 1895. Since that time there have been two deaths from typhoid fever. As to the number of cases, they have not been reported. Of scarlet fever ten cases, no deaths; diphtheria five cases, and one death; smallpox, none; Asiatic cholera, none. There have been several cases of malaria, but, according to the population, not as many as formerly. We have a better system of drainage than a few years ago, and I think will compare favorably with any other city with the same population in the Province. We, that is, the Chairman of the Board of Health, the Sanitary Inspector and myself, have worked amicably together, succeeded in having about sixteen dwelling houses, where the drainage or plumbing were very defective and had been so for some years, remedied. I would suggest, as regards the garbage, that removal be given to one or more persons, if they will remove it in a reasonable time after it has been placed in a convenient place for them to remove. I would also recommend that some one person be given the contract to remove all dead animals found on the streets or alleys, and they to remove them immediately after being notified.

(Sgd.) ROBERT LAMBERT, M.D.,  
Medical Health Officer.

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## REPORT OF SECRETARY.

WINDSOR, December 13th, 1895.

*To the Chairman and Members of the Board of Health:*

GENTLEMEN,—Pursuant to the provisions of the by-law respecting the public health, I have the honor to submit for your consideration a report upon the sanitary work done during the year, as well as upon the sanitary condition of the municipality.

In respect to the sanitary work accomplished, there is little reason for an extended statement. Nothing new in that direction has been undertaken, but the established methods for the improvement of the condition of the municipality have been employed with the usual zeal. The cost to the Board of the collection and disposal of garbage and rubbish has been \$317.90. New rules and an entirely new system for the removal of this refuse must needs be speedily put into force, in order that cheaper, more effective and safer work may be done. At present the right of way for a public thoroughfare is used for the purpose, which for obvious reasons in the interest of the community must be discontinued. A suitable piece of ground should forthwith be secured, and the work of collecting and effectual burying of garbage therein, under stringent regulations established by the Board, should be done by contract annually entered into with a responsible person. The incoming Board should recognize the duty of making this change as the one particularly demanding action at its hands.

Milk analysis, temporarily discontinued, undoubtedly effected much good, first, by showing consumers the very wide divergence in the quality of the supply obtained from the respective sources, and secondly, by convincing dealers that in order to retain trade they must bring up to, and maintain at, an established grade the milk sold within the city. The milk by-law passed by the council last January provides the machinery necessary for amply protecting our people against the evil consequences of impure milk; and if the authorities live up to the duties imposed upon them respectively by said by-law, the public must soon cease to find ground for complaint on that score. Some fifty licenses under the by-law have been issued to milk vendors, and while it is possible this number does not represent the whole, there can be but few delinquents and any such may be readily identified.

Meat inspection has thus far not been specially provided for, and it is not too much to expect from the Board, that some attention should be given to the consideration of that matter at no remote period. While milk and meat are regarded as the most common mediums of spreading disease, and, therefore, to be necessarily the most carefully and frequently tested, there are other articles of food by many observers believed to be so adulterated as to be unwholesome; and while the voice of this community is silent, or practically silent, at the present day as to any necessity for general food analysis, an organization directly charged with the duty of safeguarding the public health, can hardly acquit itself conscientiously without at least glancing at the character of the major portion of the materials upon which the public subsist.

In this connection the old story of our water supply must not be allowed to pass unnoticed. That the water has been alternately good and bad, there is hardly any doubt, and although the citizens hold diverse opinions as to the correct means to be adopted for the purpose of securing a constantly pure article for domestic use, the water commissioners have determined as a preliminary step, it is assumed, to extend the intake pipe 200 feet farther out in the river, where in the principal current they hope to avoid contamination, by sewage at any rate, and have now upon the ground a twenty-inch tube made of one-quarter-inch steel, which, by reason of the early inseting of winter, probably will not be laid until next spring. The cost of this work will be, in round figures \$2,000. It will by all be earnestly hoped that this change may solve the problem so long a live issue in Windsor, but in the event of a contrary result, other means must be resorted to and tests continued until the purest water obtainable shall be furnished our people.

Facilities for the drainage of private property have been very materially increased during the year, lateral sewers having been constructed as follows: On Pellissier street, 862 feet; Cameron avenue and Sandwich street, 2,550 feet; Vera Place, 325 feet; Wyandotte street, 655 feet; London street, 485 feet and Brant street, 180 feet—a total length of 5,057 feet, constructed at a cost of \$7,000.

Now, as to the second division of the matter that must under the by-law constitute this report, namely, the sanitary condition of the municipality.



While it has been generally remarked by citizens, especially during the summer months, that sickness prevailed to an unusual extent, it only required familiarity with other places of similar population to satisfy an enquiring mind that, despite the evidences immediately under view, Windsor ranked, in fact, second to no other town in the healthfulness of the population. The number of cases of typhoid fever, for instance, from time to time recited (they are not reported to the health office except when death ensues), occasionally provoked a feeling of uneasiness and seemed to reflect upon the quality of the river water, until, through the press and other sources, it was learned that diseases evidencing in a greater or less degree typhoid symptoms prevailed all over the country—indeed, on the other side of the boundary line as well as on this—and especially in localities where the water supply was derived from wells and not from flowing streams, when the condemnation of Detroit river water as a source of this fever became naturally less marked. There has been a large increase over last year, up to the date of this report, in the number of cases of diphtheria and scarlet fever, the number in 1895 being, of the former fourteen, and of the latter nineteen. A solitary case of smallpox and two of scarlatina complete the list, which, omitting typhoid fever for the reason above noted, gives a total of thirty-six cases of contagious diseases occurring in a population of 11,549, or a proportion of  $\frac{36}{11549}$  per 100; of the fourteen cases of diphtheria two proved fatal, and three deaths resulted from typhoid fever, a total of five deaths from contagious diseases, or one death to 2,309.8 of the population.

The total deaths registered in the city up to the date of this report, number 150, of which number, seven were non-resident, namely, two were drowned in Detroit river, two were killed on railways, and three died in hospital. If seven be added to the 150 deaths, which is a proportionate number for the balance of the year, we shall have a total of 157 for the year, as against 170 last year. Appended hereto are statements (A and B) shewing the disease reported in each case as the cause of death and the age of the deceased, which, to the professional man or others skilled in such matters, will afford material of considerable interest.

It would not be proper to close this report without reference to the pavements upon our principal streets, which have done so much towards the progress of our town, but many of which are undoubtedly nearing the end of their usefulness and becoming a source of great danger to the health of the community. Cedar block pavements certainly have their advantages, and great ones too, in a small city; but it is time that our public men were pushing comprehensive investigation in proper places towards advantages offered by the employment of other materials, or at any rate, to a better method of constructing pavements of cedar than the one practiced in this place. From a sanitary point of view, it would appear self-evident that any material that will permit of the passage of water through it to the foundation or bed of the pavement, there to remain, must be bad; whilst on economic grounds such must also be condemned, because rapid decay of the pavement and consequent expense for repairing and renewal, is an inevitable result. It is quite true that the construction of public works of the kind under notice does not fall within the province of this Board, but as guardians of the public health it should be the privilege if not the duty of the Board to warn another and directly responsible corporation of the municipality against the continuous use or adoption of materials and methods seemingly surcharged with the elements of great danger to the healthful well-being of the people. It might even be conceived, perhaps, that the Board is entitled to the right to establish the principle that no street pavement should hereafter be constructed until its foundation bed be properly and efficiently drained into a sufficient sewer, nor until, in the case of a wooden superstructure, some plan be employed to render the material as near as possible impervious to the water falling thereon.

It is worthy of note and commendation that the plan a few years ago adopted by the municipal council of constructing lot connections from public sewers to the fence line of the property intended to be drained, simultaneously with the construction of the sewer itself, has this year been followed as far as possible in respect to the half-dozen sewers completed. The great difficulty every successive Board of Health is confronted with in its endeavour to secure the drainage of wet and unhealthy premises along the line of sewers not provided with these lot connections, is the expense of the work necessarily entailed upon the lot owners, particularly in the case of main sewers, who generally can ill afford to meet the cost in a lump sum; but where drains are only needed to be made within the premises and to a comparatively easy level, the hardship disappears.

Most respectfully submitted,

STEPHEN LUSTED,  
Secretary.



## CITIES.

## REPORT to the Provincial Board of Health containing Summary of Replies

Municipality.	Names of M.H.O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Toronto.....	Charles Sheard, M.D..	House to house inspection once a year.	Scarlatina, 139 cases; diphtheria, 525 cases; typhoid, 347 cases.
Hamilton . . . . .	J. Ryall, M.D.; Lewis Macdonald, George Potter, sanitary inspectors.	General inspection.....	.....
Ottawa .....	A. Robillard, M.D.; G. McNeil, sanitary inspector.	General inspection twice a year.	Scarlatina, 182 cases; diphtheria, 287 cases; typhoid, 195 cases.
Kingston .....	S. H. Fee, M.D.; W. S. Gordon, sanitary inspector.	General inspection.....	Scarlatina, 17 cases; diphtheria, 70 cases; typhoid, 35 cases.
St. Catharines.....	No M.H.O.; A. Boulton, sanitary inspector.	House to house inspection once a year.	Scarlatina, 20 cases; diphtheria, 3 cases; typhoid, 10 cases, 1 death.
St. Thomas .....	W. C. Van Buskirk, M.D.; W. J. Shaw, sanitary inspector.	General inspection once a year.	Scarlatina, 13 cases, 1 death; diphtheria, 23 cases, 5 deaths; typhoid, 38 cases, 3 deaths.
Chatham .....	W. R. Hall, M.D.; J. R. Guttridge, sanitary inspector.	Inspection in spring of each year.	Scarlatina, 15 cases, 1 death; Diphtheria, 74 cases, 2 deaths; typhoid, 68 cases.
Windsor .....	R. Lambert, M.D.; D. Grieve, sanitary inspector.	General continuous inspection each year.	Smallpox, 1 case; scarlatina, 21 cases; diphtheria, 14 cases, 2 deaths; typhoid fever, 3 deaths.

## CITIES.

to a Circular *re* Sanitary Condition of the Municipality for the year 1895.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
Isolation hospital...	Compulsory before admission to school; 300 vaccinations.	All goods removed to disinfection station.	Forty-six returned; all public schools.	Average cubic air space 205 cubic ft.
Isolation hospital ..	No .....	Usual methods ....	Twenty-eight schools .....	.....
Isolation hospital...	Vaccination not compulsory.	Usual methods .....	Seventeen public schools, 20 separate schools.	Public schools 275 cubic feet; separate schools 225 cubic feet.
.....	No; number of children 5,721.	Usual methods .....	Nine schools .....	203 cubic feet .....
Isolation hospital for smallpox patients only.	Yes; no children vaccinated in 1895.	Disinfection under direction of physician in attendance.	Eleven schools .....	Public schools 7331 cubic ft.; separate schools 280 cubic ft.
An isolation hospital for smallpox cases.	No vaccination this year, 1895.	Generally attended to by physician having charge of the case.	Seven schools .....	About 160 cubic feet for all schools.
No hospital. Usual methods adopted for isolation purposes.	No vaccination this year.	Houses thoroughly fumigated.	Six public schools; 32 rooms.	271 cubic feet .....
Isolation at house ..	None this year .....	Usual methods .....	Eight schools .....	255 cubic feet .....

## CITIES.

## REPORT to the Provincial Board of Health containing Summary of Replies

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Toronto .....	Forms supplied .....	.....	City waterworks .....
Hamilton .....	.....	Factories 83; employees 5,000.	City waterworks; a few wells.
Ottawa .....	Yes; yes .....	.....	City waterworks; no wells..
Kingston .....	Yes; yes .....	Four factories, 1 cotton mill, 190 employees; 1 hosiery, 190 employees; 2 cigar factories, 110 employees.	Waterworks .....
St. Catharines.....	Notification forms are only supplied to physicians.	Twenty-four factories, employing 873 employees.	Waterworks; a few wells still in use.
St. Thomas .....	Physicians only supplied with forms.	A large number of factories, mills, and so forth.	City water becoming more generally used; a large number of wells still in use.
Chatham .....	Yes .....	.....	Waterworks and a few wells.
Windsor .....	No .....	Few factories. ....	Waterworks .....



## CITIES.

to a Circular re Sanitary Condition of the Municipality for the year 1895.

No. of dairy cows. Is there medical or veterinary inspection? Give details of any examination of herds for tubercu- losis.	Slaughterhouses. Give number li- censed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by con- tract or only by householder.	Sewage. How dis- posed of, whether by dry earth closets. If so is there contract re- moval?	State number and kind of noxious trades. How licen- sed and regulated? (See sec. 63 Public Health Act.)
One hundred, there is medical inspec- tion.	Thirty-five slaughter houses; offal and blood removed daily.	Garbage cremated; night soil removed by private parties.	Water closets con- nected with city sewers.	.....
164 dairy cows .....	.....	Used with ashes for filling in purposes.	Water closets con- nected with sewers.	.....
.....	No slaughterhouses in city.	Night soil removed by contract.	.....	.....
417 dairy cows; no examination.	Two slaughter- houses; none li- censed.	Night soil removed by contract.	Sewage drained into river.	Two tanneries, two tallow melters.
129 dairy cows; monthly inspection made by sanitary inspector. All in healthy condition.	Three slaughter- houses; none li- censed.	Garbage and night soil is removed by scavenger on re- quest of house- holder.	No contract .....	Three tanneries, one soap factory, one hide house.
No inspection .....	No slaughterhouses allowed in city.	No contract .....	Very few dry earth closets.	One hide house, seven tallow houses, one soap house, and gas works.
184 dairy cows; no inspection.	None .....	By contract .....	Some sewage drained into sewers,	None.
.....	None .....	By householder ....	Sewers .....	None.

## TOWNS.

Municipality.	Names of M.H.O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Aylmer .....	C. W. Marlett, M.D.; Wm. Hare, sanitary inspector.	Inspector by personal visits reports to Local Board.	Smallpox, 1 supposed case; scarlatina, 2 cases.
Amherstburg .....	Oscar Teeter, M.D.; J. R. Tomlinson, sanitary inspector.	House to house inspection during April; after that a general inspection during the balance of the year.	Scarlatina, 2 cases; diphtheria, 2 cases; typhoid, 3 cases.
Alliston .....	J. J. Harper, M.D.; George McGinnis, sanitary inspector.	Inspector made two examinations of premises during the year.	Diphtheria, 3 cases, 1 death.
Barrie .....	L. Oliver, M.D. ....	.....	One case of scarlatina was the only contagious disease reported in our town. The health of the town will compare very favorably with other years.
Brampton .....	John Fingland, sanitary inspector.	Sanitary inspector visits all premises once a year.	Scarlatina, 5 cases, 1 death.
Bracebridge .....	Samuel Bridgland, M.D.; Thomas Dodd, sanitary inspector.	Inspector visits all premises four times a year.	Diphtheria, 32 cases, 3 deaths; typhoid fever, 13 cases.
Bowmanville .....	B. Lammiman, M.D.; Richard Jarvis, sanitary inspector.	General inspection yearly ...	Scarlet fever, 40 cases; diphtheria, 29 cases, 7 deaths; typhoid fever, 5 cases, 1 death.
Brockville .....	— Harding, M.D. ....	Satisfactory sanitary condition.	Typhoid fever, 10 cases; measles, 9 cases; scarlet fever, 4 cases; diphtheria, 30 cases, 5 deaths.

## TOWNS.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air spaces to each pupil.
Smallpox patients isolated; no regular hospital.	All school children vaccinated that had not distinct marks of successful vaccination.	All houses are disinfected and fumigated under the care of M. H. O.	Two public schools, 9 rooms, average 47 in each; collegiate institute, 6 rooms, average 25 in each.	Public school, 260; collegiate institute, 450.
No isolation hospital; house is placarded; children not allowed to attend school; the attending physician sees to disinfection of clothing, etc.	None .....	.....	Three schools, 4 rooms in public, 1 in separate (colored), 1 in separate (R. C.).	.....
No isolation hospital; houses are placarded.	No; vaccination is not compulsory.	.....	One public school, 6 rooms, average attendance, 45.	220 per pupil .....
.....	400 vaccinated .....	.....	Our schools are in a fair sanitary condition.	.....
No hospital .....	Vaccination compulsory; 535 children on school roll.	.....	Four schools; number of rooms, 12; average attendance, 44.	.....
No isolation hospital.	No; 859 school children.	Disinfected under direction of M. H. O.	One school; number of rooms, 7; average attendance, 64 in each room.	.....
Isolation; houses placarded; no hospital.	Vaccination compulsory; 680 school children.	.....	Three schools .....	250 cubic feet .....
.....	.....	.....	.....	.....



## TOWNS.—Continued.

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Aylmer .....	Yes; both used; yes..	Door and sash factory, 10 hands; canning factory and vegetables and meats, from 20 to 100 hands; door and sash, 6 hands; organ factory, 3 hands; organ factory, 5 hands; barrel and stave factory, 10 hands; staves and lumber, 10 hands; horse net factory, 5 hands; hubs and spoke factory, 15 hands; cider and vinegar factory, 3 hands; flour and feed mills, 6 hands; furniture factory, 15 hands; foundry, 15 hands.	Wells only; sand and clay loam with quicksand sub-soil.
Amherstburg .....	Yes; the secretary of Local Board notifies the teachers.	None .....	Waterworks system; intake from Detroit river.
Alliston .....	Yes .....	Woollen factory, 30.....	Wells; soil sandy.....
Barrie.....	.....	.....	From artesian wells; good quality.
Brampton .....	None .....	Factories, 4 .....	Wells for domestic purposes.
Bracebridge .....	Supplied to physicians only.	Two factories; 2 tanneries ..	Partly from municipal waterworks; partly from wells.
Bowmanville .....	Yes; both supplied...	One factory, 100 employees; 2 foundries, 20 employees.	Well water; good; soil, clay loam; sub-soil, clay.
Brockville .....	.....	.....	.....

## TOWNS.—Continued.

of dairy cows. Is there medical or veterinary inspection? Give details of any examination of herds for tuberculosis.	Slaughterhouses. Give number licensed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so, is there contract removal?	State number and kind of noxious trades. How licensed and regulated? (See sec. 63, Public Health Act.)
dairies inside corporation; no inspection.	None inside municipality.	Garbage taken away by householder; night soil by contract.	Dry earth closets; night soil carted away under contract; sewage disposed of by sewage drains.	None.
ae .....	None within municipality.	By householder ....	Householder makes contract to bury the same.	None.
o dairies; no veterinary inspection.	Four slaughterhouses.	By householder; sanitary inspector is watchful in this matter.	Street sewage goes to the river.	None.
.....	.....	Good sewerage system.	.....	.....
enty dairy cows; no inspection.	Four slaughterhouses; licensed.	Some by contract; some by householder.	.....	None.
erty-six dairy cows; no inspection.	One slaughterhouse; none licensed.	By contract .....	Dry earth closets ...	None.
o dairies, 25 cows each; no inspection.	Five slaughterhouses; on the outskirts of town.	Garbage and night soil removed by householder.	Sewage disposed of by drains; several dry earth closets in private residences.	None.
milk supply is exceptionally good.	.....	.....	Everything being done to make the sewage good.	.....

TOWNS.—*Continued.*

Municipality.	Names of M. H. O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Clinton .....	J. W. Shaw, M.D.; J. Wheatly, sanitary inspector.	Notices are distributed 1st April to every householder, giving till 1st May to clean up. Inspector visits afterwards, if not cleaned the officer engages help and charges same against the property.	Scarlatina, 15 families; typhoid, 12 cases, 1 death.
Cobourg.....	E. C. McNichol .....	Ordered many premises cleaned.	Scarlatina, 7 cases; diphtheria, 4 cases, 2 deaths; typhoid, 4 cases.
Collingwood.....	A. R. Stephen, M.D.; B. F. Lewis, sanitary inspector.	Once a year general inspection made.	Scarlatina, 29 cases; typhoid, 15 cases.
Dresden.....	Edwin Gougin, sanitary inspector.	Inspection in the spring and at intervals during the year of all back yards, premises and privies.	Scarlatina, 2 cases; diphtheria, 6 cases, 2 deaths; typhoid, 3 cases.
Dundas .....	T. A. Bertram, M.D.; Peter Atkins, sanitary inspector.	.....	Typhoid, 1 case.....
Elora .....	David Geddes, sanitary inspector.	General inspection in spring.	Typhoid, 4 cases.....
Essex .....	G. McKenzie, M.D.; J. Gormley, sanitary inspector.	Thorough inspection several times a year.	Diphtheria, 1 case; typhoid, 6 cases.
Fenelon Falls .....	A. Wilson, M.D.; S. Nevison, sanitary inspector.	Inspection in spring. Notices sent out calling on all residents to clean up.	Scarlatina, 25 cases .....
Forest].....	H. J. Nash, M.D.; Henry Harvey, sanitary inspector.	Regular inspection.....	.....
Fort William.....	W. H. Hamilton, M.D.	Health of town good during the year.	Measles, 23 cases; scarlatina, 11 cases; typhoid, 3 cases, with 1 death; diphtheria, 7 cases, 2 deaths.



## TOWNS.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
No hospital. Every house infected is placarded and isolation demanded.	No; 474; about 15..	Houses disinfected with sulphur and chloride of lime, all offal disinfected and buried, clothing boiled and saturated with curative sublimate solution.	Two schools, 13 rooms, average attendance 300.	225 feet .....
.....	.....	.....	.....	.....
No isolation hospital.	No; 856 school children on roll.	.....	Four schools, 39 children in each room.	Lots of air space....
Patient separated from other members of the family; no hospital; houses placarded.	Yes; 535, between the ages of 7 and 21; none.	The use of disinfectants under supervision of the medical attendant.	Three; 8 rooms; attendance in each 45, 31, 32, 45, 50, 54, 56; total 345.	240 .....
Patients removed to some unoccupied building.	Vaccination not compulsory.	.....	One school; 13 rooms; about 450 pupils.	.....
None .....	No general vaccination.	Physicians in attendance take charge in such cases.	Three schools .....	300 cubic feet in public and separate schools, 800 in high school.
Isolate the house; no hospital.	A thorough vaccination of children one year ago.	Ordinary means employed.	Two schools .....	300 cubic feet .....
No isolation hospital.	No .....	All clothing fumigated.	Two schools .....	242 cubic feet .....
.....	No .....	.....	Two schools, high school, public school.	250 cubic feet .....
Every precaution taken; the medical health officer paying much attention in such cases.	.....	.....	.....	.....

## TOWNS.—Continued.

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where used give character of soil and sub-soil.
Clinton .....	Yes; supplied to teachers of all schools and M.D's. of towns.	Seven factories, organ factory, 7; planing mills, 3; tanning mill, 1; thrashing machine, 1; barrel factory, 2; bicycle factory, 2; carriage, 3.	All wells; mostly surface water; gravel bottom.
Cobourg .....	.....	.....	.....
Collingwood .....	None supplied .....	One factory, 45 employees...	Waterworks; few wells.
Dresden .....	Supplied to teachers who use them as occasion requires.	Hub, spoke and bending factory, average 85; stave and hoop factory, 50; sash and door factory and planing mill, 5; foundry and machine shop, 4.	Wells; two thirds of town sandy loam with quick sand; one-third clay loam with clay sub-soil.
Dundas .....	Yes .....	Nine factories .....	Waterworks and wells ...
Elora .....	Forms supplied to physicians.	Four factories; number of employees, 131.	Wells; clay loam upon limestone rock; wells bore into rock.
Essex .....	No forms supplied .....	Three factories; two saw mills.	Wells .....
Fenelon Falls .....	Yes .....	Ten factories and mills .....	Chiefly from wells .....
Forest .....	Yes .....	One flour mill, 1 sash factory, 1 foundry.	Wells; sandy loam, clay soil.
Fort William .....	.....	.....	.....

## TOWNS.—Continued.

No. of dairy cows. Is there medical or veterinary inspection? Give details of any examination of herds for tuberculosis.	Slaughterhouses. Give number licensed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so, is there contract removal?	State number and kind of noxious trades. How licensed and regulated? (See sec. 63 Public Health Act.
One dairy, 65; one dairy, 40; both herds are inspected for tuberculosis.	Four; no license; offal fed to pigs.	By householder; placed on farms 1½ miles from town.	A few dry earth closets.	None.
Milk supply found of good quality.	Slaughterhouses in good condition.	.....	.....	.....
478 dairy cows .....	Four slaughterhouses.	.....	Central part of town dry earth closets.	None.
None in municipality.	None in municipality.	By householder ....	Partly by dry earth closets; principally thrown on vacant lots.	None.
.....	None in town .....	By householder ....	Some dry earth closets.	None.
None .....	Slaughterhouses not licensed.	By householder; dry earth closets in general use.	No contract removal.	None.
None .....	None .....	By contract; dry earth closets.	No sewers .....	None.
No inspection .....	None .....	By householder ....	No system .....	.....
None .....	Two slaughterhouses.	By householder ....	Dry earth and pit closets.	.....
.....	.....	.....	.....	.....



TOWNS.—*Continued.*

Municipality.	Names of H. M. O. and sanitary inspector.	State, extent and methods of general inspection.	Contagious diseases.
Gore Bay.....	J. Johnston, M.D.; D. Beatty, sanitary inspector.	Directly anything in shape of disease is ascertained his is disinfected and isolated.	Typhoid, 3 cases.....
Galt.....	J. S. Wardlaw, M.D.; Adam Ray, sanitary inspector.	House to house inspection once a year.	Scarlatina, 4 cases; typhoid, 10 cases; 4 deaths.
Ingersoll.....	M. F. Lucas, M.D....	Every cesspool within the corporation has been cleaned up. This work has been done systematically and thoroughly.	Our death rate is very low, being about one for every 77 of the population; diphtheria, one death.
Kincardine.....	N. Hopkins, M.D.; J. Pratt, sanitary inspector.	General inspection from house to house.	Diphtheria, 15 cases, 2 deaths; typhoid, 27 cases, 2 deaths.
Lindsay.....	J. McAlpine, M.D....	Sanitary condition highly satisfactory.	Measles, 7 cases; scarlatina, 8 cases, 1 death; diphtheria, 35 cases, 7 deaths.
Meaford.....	C. R. Maclean, M.D.; R. Dealy, sanitary inspector.	Frequent visits are made by sanitary inspector through thickly settled parts of the town.	Scarlatina, 11 cases reported; 1 death.
Mount Forest.....	No M. H. O.; Chas. Boulding, sanitary inspector.	Inspector makes visits once or twice a year.	Scarlatina, 8 cases; diphtheria, 4 cases, 1 death; typhoid, 12 cases, 1 death.
Mattawa.....	M. James, M.D.; M. Filkin, sanitary inspector.	Inspector carefully inspects premises three times a year.	Diphtheria, 3 cases; typhoid, 2 cases.
Napanea.....	E. B. Perry, sanitary inspector.	Thorough inspection in spring	Typhoid, 14 cases, 1 death..
Newmarket.....	D. M. Campbell, M.D.; P. J. Anderson, sanitary inspector.	General inspection made by sanitary inspector.	Typhoid, 2 cases, 1 death...

## TOWNS.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
House isolated; garments, furniture, etc., fumigated; garments, when necessary, burned.	Yes; none this year, being all vaccinated 1894.	No contagious diseases have found foothold, owing to the vigilance of Dr. Johnston.	One school, 3 rooms—1st, 30; 2nd, 40; 3rd, 50.	.....
No isolation hospital.	Yes; vaccination in 1895.	.....	Four schools; one high school.	.....
.....	A number of persons were vaccinated.	.....	.....	.....
Confined as far as possible to the house; no hospital.	Vaccination general.	Usual methods adopted.	Two schools—High School, 85 pupils; Public School, 9 rooms; 397 pupils in all.	High school, 525 cubic feet; public school, 240 cubic feet.
Usual method adopted.	.....	.....	.....	.....
Isolation of patient as far as circumstances will allow; no hospital.	No; cannot say how many vaccinated.	Washing of walls of dwellings, use of disinfectants and other methods.	High school, 5 rooms, 75 to 100 pupils; public schools, 9 rooms; average attendance about 50 in each.	.....
No hospital; usual methods at house of patient.	About 400; no record of number vaccinated.	Each medical doctor has promised to attend to this matter in his practice.	Two schools; 9 in one, 7 in the other.	Don't know.
Isolation hospital.	Not compulsory; 603 school children; no vaccination during the year.	General methods adopted.	Two schools.....	One hundred and twenty cubic feet.
No isolation hospital. Houses placarded.	Not compulsory ....	By physicians in charge.	Three schools. Average attendance in each room 40.	About 258 cubic feet.
No isolation hospital. Usual methods.	No .....	Houses fumigated ..	Four schools.....	.....

## TOWNS.—Continued.

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Gore Bay .....	Cannot say .....	Two factories—saw and grist mill, 20 hands; 1 planing mill, 4 hands.	Wells and lake; clay loam and gravel.
Galt .....	.....	Twenty-three factories .....	Town waterworks .....
Ingersoll .....	.....	.....	.....
Kincardine .....	No .....	Cabinet factory, 80 hands; stove foundry, 20 hands; boiler works, 15 hands; foundry, 12 hands.	From the lake.....
Lindsay .....	.....	.....	M. H. O. draws attention to the fact that in the five families having typhoid, all used well water.
Meaford .....	Yes; yes .....	No large factories; 1 planing factory, 1 carpet factory, 1 foundry, 1 saw mill, 1 grist mill.	Waterworks supply water for domestic service in central part of the town; many wells used.
Mount Forest .....	Yes; yes .....	One large cabinet factory, 41 hands; flour and oatmeal mills, 20 hands; other factories, small, about 10 hands.	Wells; gravel and blue clay.
Mattawa .....	No .....	No factories.....	Water is drawn from Mattawa and Ottawa Rivers.
Napanee .....	Yes .....	One furniture factory, 35 employees; 1 carriage factory, 15 employees; 2 grist mills, 20 employees; 2 sash factories 15 employees; 1 soap factory, 6 hands, and numerous others.	Wells; mostly clay with rock bottom.
Newmarket .....	Yes .....	Ten factories and mills.....	Wells .. .. .



## TOWNS.—Continued.

No. of dairy cows. Is there medical or veterinary inspection? Give details of any examination of herds for tuberculosis.	Slaughterhouses. Give number licensed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so, is there contract removal?	State number and kind of noxious trades. How licensed and regulated? (See sec. 63 Public Health Act.)
None; no general dairy.	Two; none licensed; offal fed to hogs.	.....	.....	.....
.....	.....	By householder ....	Privy pit system still in use.	.....
The milk supply of the town is being kept under surveillance by a system of vendor's licenses and an inspector and test of the milk supplied.	.....	.....	Next season we expect to put in a system of sewerage.	.....
None ..	Two .....	By householder ....	Under direction of sanitary inspector.	None.
.....	.....	.....	M. H. O. advises board to construct sewers.	.....
No dairy cattle kept here.	One slaughter-house; no drainage system; offal is fed to hogs.	No system of disposal.	No system of sewerage.	None.
Two dairies; no inspection.	Three in outskirts of town.	By householder ....	No contract removal.	None.
None .....	None .....	Removed by contract.	.....	None.
One hundred and fifty-six cows; no inspection.	Three slaughter-houses; no license; offal fed to pigs.	By householder to dumping pit within town.	Dry earth closets....	No complaints made as to noxious trades.
A few cows .....	None in town .....	By contract .....	Dry earth closets and pits.	None.

TOWNS.—*Continued.*

Municipality.	Names of M. H. O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Niagara Falls .....	G. W. Oliver, M.D.; S. Ward, sanitary inspector.	When necessary the sanitary inspector visits premises.	.....
Orangeville .....	C. M. Smith, M.D.; R. Shields, sanitary inspector.	General inspection once a year.	Scarlatina, 1 case; diphtheria, 2 cases.
Orillia .....	W. C. Gilchrist, M.D.; Mr. Dreyer, sanitary inspector.	House to house inspection in spring.	Scarlatina, 27 cases, 2 deaths, diphtheria, 40 cases, 6 deaths.
Owen Sound.....	Allan Cameron, M.D.	General inspection.....	Scarlatina was epidemic during the year.
Paris .....	D. Dutton, M.D.; J. S. Green, sanitary inspector.	In May of each year, house to house inspection is made.	Diphtheria, 1 case; typhoid 10 cases; 3 deaths.
Peterborough .....	J. Clarke, M.D.; G. J. Rosgel, sanitary inspector.	A very thorough inspection made by inspector during the year.	A number of cases of typhoid
Petrolia.....	G. D. Loughheed, M.D.; J. Ferguson, sanitary inspector.	Regular inspection.....	Yes; about 800 school children.
Pembroke .....	W. W. Dickson, M.D.; John Campbell, sanitary inspector.	House to house inspection in spring.	Scarlatina, 34 cases, 1 death; diphtheria, 18 cases, 2 deaths; typhoid, 17 cases, 6 deaths.
Piston .....	H. B. Evans, M.D.; H. N. Babbitt, sanitary inspector.	.....	.....
Prescott.....	W. P. Buckley, M.D.; Robert Smith, sanitary inspector.	.....	.....

## TOWNS.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases; give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
.....	In 1894 vaccination was very general.	Usual methods employed.	Three schools .....	.....
Isolation as far as possible.	Not compulsory .....	.....	Two schools .....	.....
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
Contagious diseases are isolated in their houses, and disinfectants used; members of families not allowed to attend school or work in factories.	Yes; so far as the school children are concerned, but not for others; 100 were vaccinated in 1894 and 25 in 1895.	This depends upon the medical attendant.	Five schools; high school, 6 rooms, attendance 70 to 80; separate school, 2 rooms, 63 in attendance; first ward, 4 rooms, attendance 216; south ward, 2 rooms, attendance 100; north ward, 1 room, attendance 25.	About 190 cubic feet.
Isolation hospital .....	.....	.....	.....	.....
.....	.....	.....	.....	.....
Usual methods adopted	Vaccination not compulsory; 1,130 school children.	.....	Five schools.....	.....
.....	.....	.....	.....	.....
.....	No .....	Usual methods .....	Three schools .....	Cubic air space public school 210 cubic feet.



## TOWNS.—Continued.

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Niagara Falls .....	No .....	Two factories, 105 employees.	Niagara River; in a few cases wells.
Orangeville .....	Yes .....		Wells .....
Orillia .....			Water supply exceptionally good.
Owen Sound.....	Yes .....		
Paris .....	No forms for teachers.	Woollen, winsey, alabastine, needle, nickel plating and carpet manufacturers, employing 450 hands.	Public supply from springs; a number of wells are used on the flats, there is danger of contamination; sub-soil gravel. soil light and stony.
Peterborough .....			
Petrolia .....	No forms .....		
Pembroke.....	Not always used, but supplied as required.	No factories in which there are many employees.	Lake and wells; board have urged the closing of wells in thickly settled portion of town.
Pictou .....	Made use of when required.	Two canning factories, employees 250.	Springs and wells .....
Prescott.....	No forms .....	One distillery, 50 employees; 1 brewery, 20 hands; 1 emery factory.	Wells; limestone rock, mixed clay and gravel.

## TOWNS.—Continued.

No. of dairy cows. Is there medical or veterinary inspection? Give details of any examination of herds for tuberculosis.	Slaughterhouses. Give number licensed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so, is there contract removal?	State number and kind of noxious trades. How licensed and regulated? (See sec. 63 Public Health Act.)
None .....	None .....	By contract .....	.....	None.
No inspection .....	.....	By householder .....	.....	One tannery.
.....	.....	.....	.....	.....
Milk supply very good.	.....	The work of removal is very satisfactory	.....	.....
About 90 inspections; only partial; no special examinations for tuberculosis.	All are removed from limits of town; no licenses issued.	Night soil by contract with the Board; garbage looked after by householder.	There is no system; a few sewers exist and are discharged into Grand River.	None.
Milk supply consid- ered very satisfac- tory.	.....	.....	The methods adopted for the removal of night soil are con- sidered satisfactory	.....
Thirty cows; no ex- amination.	Three slaughter- houses.	By contract .....	.....	None.
One hundred and fifty dairy cows; no inspection.	One slaughterhouse; in good condition.	By householder ....	Dry earth closets; removal by house- holder.	None.
.....	None allowed in cor- poration.	By householder ....	Dry earth closets ...	None.
No inspection .....	None in town.....	By householder ....	.....	None.

TOWNS.—*Continued.*

Municipality.	Name of M. H. O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Rat Portage.....	S. S. Scovil, M.D.; R. B. Donkin, sanitary inspector.	.....	Typhoid, 12 cases .....
Renfrew .....	T. D. Halligan, M.D.; B. J. McDermott, sanitary inspector.	.....	Typhoid, 20 cases; 2 deaths.
Strathroy .....	G. Henderson, M.D.; Robt. Miller, sanitary inspector.	.....	Seven cases smallpox in 1894; 1 case scarlatina, 1 diphtheria, 1 typhoid in 1896.
Sault Ste Marie .....	John L. Rae, sanitary inspector.	General inspection made once a year.	Scarlatina, 24 cases; typhoid, 44 cases.
Simcoe .....	J. C. C. Grassett, M.D.; George Coates, sanitary inspector.	In spring a careful inspection is made.	Typhoid, several cases.....
Seaforth .....	Dr. Burrows; Wm. Gillespie, sanitary inspector.	One general inspection during May.	.....
Thessalon .....	T. J. McCort, M.D.; William Higgins, sanitary inspector.	General inspection.....	Scarlatina, 3 cases.....
Thorold .....	J. K. Johnston, M.D.	House to house inspection ..	Typhoid, 2 cases; 1 death ..
Toronto (North).....	S. R. Richardson, M.D.; G. H. Lawrence, sanitary inspector.	General house to house visitation.	Scarlatina, 1 case; diphtheria, 11 cases; typhoid, 5 cases.
Tilsenburgh .....	O. McDonald, M.D.; A. Pow, sanitary inspector.	Regular inspection every three months.	.....
Uxbridge .....	H. Bascom, M.D.; Wm. Tuck, sanitary inspector.	House to house inspection ..	Typhoid, 35 to 40 cases.....



## TOWNS.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details of how carried out.	Number of schools: Number of rooms and attendance in each.	Average cubic air space to each pupil.
No isolation hospital.	No .....	.....	Four schools .....	.....
No hospital .....	Vaccination not compulsory.	.....	Four schools .....	.....
Houses placarded. Temporary hospital during smallpox epidemic for smallpox patients only.	Compulsory; 921; no report of number vaccinated.	Rules laid down by Provincial Board carefully carried out under the direction of M. H. O.	Three public school houses; 9 rooms; average to each room, 45 to 50.	.....
No special arrangements made.	No vaccination took place this year.	As directed by physician in charge.	Three schools .....	Varying from 100 to 300 cubic feet.
No arrangements made in such cases.	.....	None found necessary, having had no contagious diseases during the year.	Two schools .....	The air space is considered ample.
No isolation hospital.	Number of school children, 624.	No uniform method.	Two schools; 1 public school, 1 high school.	Average cubic air space per room 295 cubic feet.
No hospital .....	Yes .....	Usual methods .....	Three schools .....	.....
No hospital .....	No .....	.....	.....	223 cubic feet .....
Isolated at house...	350 school children.	Usual methods .....	Two schools .....	252 cubic feet .....
.....	Yes; 350 school children.	.....	Two schools .....	Average cubic air space 210 feet.
Isolated at home ...	No .....	.....	2 schools; 1 high, 1 public.	240 cubic feet .....

TOWNS.—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Rat Portage.....	No forms .....	Three saw mills, employees 250; Four mills 80 employees; 1 box factory, 10 employees.	Principally from lake. Few wells.
Renfrew.....	No forms .....	One woollen factory and 3 mills.	Wells; clay soil and sub-soil.
Strathroy .....	Yes.....	One canning factory, 1 rake factory, 1 foundry and machine shop, 2 saw mills, 2 flour mills, 1 dairy school, 2 shingle factories, 1 stove factory, 1 carding mill and cloth factory, 1 flax mill, 1 brewery, 1 pop factory, 3 tailor establishments.	Domestic purposes; wells only; soil sandy.
Sault Ste. Marie.....	No .....	Three factories .....	Wells and springs .....
Simcoe .....	Yes .....	Six factories and mills; about 66 employees.	Wells; supply good .....
Seaforth.....	Yes .....	One cabinet factory, 2 planing mills, 1 foundry, 3 mills; total employees, 112.	Wells; clay loam; clay ....
Thessalon . .....	No forms .....	.....	Wells and lake .....
Thorold .....	No forms .....	One factory; 50 employees..	Wells; clay soil .....
Toronto (North) .....	Don't know .....	.....	Wells; sub-soil gravel bed; pure water.
Tilsonburg .....	Yes .....	None .....	Wells; clay loam with gravel sub-soil.
Uxbridge .....	.....	.....	Wells .....

## TOWNS.—Continued.

No. of dairy cows. Is there medical or veterinary inspection? Give details of any examination of herds for tuber- culosis.	Slaughterhouses. Give number li- censed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by con- tract or only by householder.	Sewage. How dis- posed of, whether by dry earth closets. If so, is there contract re- moval?	State number and kind of noxious trades. How licen- sed and regulated? (See sec. 62 Public Health Act.)
128 dairy cows. No inspection.	Three slaughter- houses; no license; offal fed to pigs.	Part by contract....	.....	None.
306 dairy cows. No inspection.	One slaughterhouse.	By contract . . . . .	Dry earth closets; contract removal.	None of any import- ance.
No record. No in- spection. No ex- amination of herds.	Two slaughterhouses; no license.	By contract . . . . .	Disposed under direc- tion of board of health.	One tannery, two slaughterhouses not licensed; regulated by inspector.
About 130. No ....	Two slaughterhouses; no license. Under careful inspection.	By householder ....	No contract for re- moval.	None.
.....	No slaughterhouses within the town.	Partly by town and partly by contract.	.....	None.
None within the municipality.	None .....	By householder ....	Very few dry earth earth closets.	None.
No inspection .....	Two slaughterhouses;	By householder ....	Drained to river and lake; no dry earth closets; no contract removal.	None.
None in town .....	None .....	By householder ....	Dry earth closets and vaults. By house- holder.	None.
389 cows .....	Seven slaughter- houses.	In majority of cases premises are large enough to admit of its being buried.	A few dry earth closets.	None except slaugh- terhouses, which are licensed.
100 cows.....	Two slaughterhouses.	By contract .....	Dry earth system; contract removal.	None.
None .....	2 slaughterhouses ..	By householder ....	.....	None.



TOWNS.—*Concluded.*

Municipality.	Names of M. H. O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Whitby .....	D. P. Bagart, M.D. ...	House to house inspection...	Diphtheria, 5 cases .....
Walkerville .....	C. W. Hoare, M.D. ; A. B. Griffith, sanitary inspector.	House to house inspection by sanitary inspector.	Scarlatina, 7 cases ; diph- theria, 2 cases.
Wingham .....	.....	House to house inspection...	Number of cases of typhoid ; one case of scarlatina.
Woodstock .....	A. McLay, M.D. ....	General inspection. Sanitary literature sent out to each house.	Diphtheria, some cases ; scarlatina, some cases.
Walkerton .....	G. J. Dickeson, M.D. ; G. H. McKay, sanitary inspector.	Sanitary inspector made house to house inspection.	Diphtheria, 18 cases ; 1 death.

TOWNS.—*Concluded.*

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
.....	No; number of children, 853; none reported.	Under supervision of medical attendant.	5. Collegiate institute, 4 rooms, attendance as follows: 30, 29, 32, 25; Henry St. school, 4 rooms, attendance 53, 52, 33, 27; Model School, 4 rooms, 56, 35, 28; Dufferin St. school, 2 rooms, 28, 35; Separate school, 1, attendance 39.	Collegiate Institute 397 feet; Dufferin St. 362; Henry St. 279; Model 297; Separate 274.
House placarded and inmates quarantined. No isolation hospital.	Compulsory as far as school children are concerned, 184. All have been vaccinated before 1895.	Fumigation by sulphur; all apertures are closed and powder allowed to burn for 8 hours; 3 lbs. to 1,000 cubic feet.	One school, 5 rooms; attendance in each 34, 27, 26, 27, 43.	400 cubic feet .....
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
No isolation hospital.	No; number of children 947.	Under control of sanitary inspector.	3 schools; 1 public, 1 separate, 1 high.	High school 375, public school 194, separate school 196.

TOWNS.—*Concluded.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Whitby .....	Yes. M. H. O .....	1 laundry, 8; 1 tannery, 45; 1 harness hardware, 30; 1 fruit evaporator, 75.	Wells; clay loam, clay and hardpan.
Walkerville .....	No .....	Eleven factories and manufacturing companies, comprising brewery, distillery, foundry, planing mill, basket factory, wire fence works, cooper shop, blacksmith shop, Globe furniture works, malleable iron works, engine works; 60, 50, 20, 25, 40, 10, 15, 5, 60, 40 to 100, 25, respectively.	Waterworks; no wells used.
Wingham .....	.....	.....	.....
Woodstock .....	.....	.....	One hundred new water services put in during the year.
Walkerton .....	Yes; yes .....	.....	Waterworks, springs and wells.



TOWNS.—*Concluded.*

No. of dairy cows. Is there medical or veterinary inspec- tion? Give details of any examina- tion of herd for tuberculosis.	Slaughterhouses. Give number li- censed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by con- tract or only by householder.	Sewage. How dis- posed of, whether by dry earth closets. If so, is there contract re- moval?	State number and kind of noxious trades. How licen- sed and regulated. (See sec. 63 Public Health Act.)
None .....	3; offal spread over land as a fertilizer.	By householder ....	No system.....	None.
Not any.....	Not any.....	Board of works col- lects garbage weekly; all clo- sets empty into sewers.	Sewers empty into Detroit river.	Not any.
.....	.....	Privy pits in general use.	.....	Not any.
Over 100; no exam- ination.	3 slaughterhouses...	Night soil removed by contract.	Sewers and dry earth closets.	None.

## VILLAGES.

Municipality.	Names of M.H.O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Ailsa Craig .....	J. A. Anderson, M.D.	Members of local board acted as sanitary inspectors.	Typhoid, several cases reported.
Allandale .....	No M. H. O. ; Ed. Burns, sanitary inspector.	Inspection made in the spring of each year of all back yards and closets.	None .....
Alvinston .....	A. McKinnon, M.D. ; N. Patterson, sanitary inspector.	House to house inspection...	No contagious diseases.....
Arthur .....	Dr. Allan ; H. Cole, sanitary inspector.	General inspection.....	Typhoid, 9 cases.....
Brighton .....	N. B. H. Dean, M.D. ; S. W. Donaghy, sanitary inspector.	.....	Diphtheria, 2 cases.....
Bolton .....	D. Bonner, M.D. ; S. A. Malford, sanitary inspector.	Visiting three times a year..	Diphtheria, 2 cases .....
Brussels.....	J. A. McNaughton, M.D. ; John Wright, sanitary inspector.	Inspector visits premises and sees they are cleaned.	Typhoid, 7 cases ; 1 death ..
Bayfield.....	C. Sheppard, M.D. ; Jas. Whitten, sanitary inspector.	Inspector did not act.....	Typhoid, 1 case .....
Belle River .....	C. C. Richardson, M.D. ; T. Sauve, sanitary inspector.	.....	None .....
Beeton .....	Dr. Law, M. H. O. ; John Livingston, sanitary inspector.	General inspection in May..	Diphtheria, 3 cases ; 1 death.
Beaverton .....	A. Grant, M.D. ; Wm. Bain, sanitary inspector.	House to house inspection twice a year.	Scarlatina, 7 cases : typhoid. 1 case.
Chippawa .....	M. C. Dewar, M.D....	.....	Typhoid, 1 case .....

VILLAGES.—*Continued.*

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and How carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
None .....	No ; none.....	None .....	One ; 3 ; 43, 41, 70.	180 feet .....
None .....	Not this year, but it has been in former years ; 242 in municipality ; 25 vaccinated.	No contagious disease this year.	One school ; 3 rooms ; average attendance, 55, 48, 57.	210 feet .....
.....	No ; about 260 school children.	.....	Two schools .....	.....
No isolation.....	No .....	.....	Two schools .....	.....
.....	No .....	.....	Two schools ; 1, 4 rooms ; 1, 2 rooms.	.....
Patients kept isolated from other members of the family.	No .....	The sick room disinfected as much as possible.	One school ; 4 rooms ; average attendance in each, 40.	About 270 .....
Greatest care taken to disinfect the premises.	No ; 287 ; can't say.	Cleanliness, burying of discharges and use of disinfectants	One ; 6 rooms .....	.....
No hospital ; patient and nurse excluded from outside intercourse.	All school children vaccinated in 1894 ; none in 1895.	Typhoid excreta disinfected, bedding, etc., boiled or burned.	One ; 2 rooms ; 45, 44.	220 cubic feet .....
.....	Children were all vaccinated in 1894.	.....	One ; 3 rooms ; 53 children in each.	226 cubic feet .....
No hospital ; houses fumigated.	Not compulsory ....	Thorough disinfection.	One school ; 3 rooms.	350 cubic feet .....
None ; no hospital..	Not compulsory ....	Usual methods .....	One school ; 3 rooms.	400 cubic feet .....
Isolated in dwelling house ; houses are placarded ; no isolation hospital.	Yes ; between 90 and 100 ; none.	Boiling and burning when deemed necessary ; disinfection with sulphur fumes, washing with bichloride soda, etc.	One school ; 2 rooms ; attendance, 50 and 54 respectively.	206 cubic feet .....



VILLAGES.—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Ailsa Craig	None; no; no.....	Flax mill, 20 hands; apple factory; sawmill, 10 hands; flour mill, 4 hands.	Wells; gravelly soil; gravel sub-soil.
Allandale	Teachers not supplied.	None	Mostly sand
Alvinston	Forms supplied	Three factories	Wells; sandy loam and clay sub-soil.
Arthur	Yes	Two factories	Wells
Brighton	No	None	Wells; principally sandy loam.
Bolton	Teachers not supplied; M. H. O. on application to village clerk.	One woollen mill, 20; 1 planing mill, 3; 2 foundaries, 12; 1 carriage factory, 2; 1 cooperage, 4; 1 pottery, 2; 1 flour mill, 6.	Top soil, clay loam; sub-soil, gravel.
Brussels	Yes; yes	Two planing mills, 1 foundry, 1 flax mill, 2 flour mills, 1 salt factory, 1 woollen mill, 1 sawmill.	Wells; clay and limestone rock.
Bayfield	None supplied	None	Wells; sandy loam
Belle River	Yes	None	Black muck and clay
Beeton	No forms	One factory, 25 employees	Waterworks and wells
Beaverton	No	Six factories and mills	Wells; clay loam, with clay sub-soil and gravel.
Chippawa	Yes	One sash and door factory, 3 hands.	Wells; clay sub-soil

## VILLAGES.—Continued.

No. of dairy cows. Is there medical or veterinary inspection? Give details of any examination of herds for tuberculosis.	Slaughterhouses. Give number licensed. How drained and how disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so, is there contract removal.	State number and kind of noxious trades. How licensed and regulated? (See sec. 63 Public Health Act.)
About 20; no; no ..	None; 2 outside of village; no system of drainage; offal fed to hogs.	By contract in spring of each year.	Conveyed to lands outside of village by contract.	None.
Sixty; yes; none ..	None .....	Householder.....	Householder .....	None.
No cows.....	One slaughterhouse.	By householder ....	Dry earth closets ...	None.
Two dairies; no inspection.	None .....	Householder .....	A few dry earth closets.	None.
Seventy-five to 100 on farms chiefly; no inspection; no examination.	Two: none licensed.	Householders .....	None .....	None.
Four dairy cows; no medical or veterinary inspection.	Two slaughterhouses.	Used for agricultural purposes.	No dry earth closets.	None.
None; parties generally keep 2 or 3 cows; no; none.	None; 2 about half mile from village.	Taken to dumping ground outside of village by householder.	No sewers; closets and dry earth pits.	None.
No regular dairy nor inspection.	None .....	Burned by householder.	No sewage system ..	None.
.....	No licensed slaughterhouses except one, it being a good distance from any dwelling.	By householder .....	.....	None.
Sixty cows; no inspection.	One slaughterhouse not licensed.	By householder ....	No sewage system ..	None.
No cows.....	None .....	Householder.....	Dry earth closets ...	None.
None .....	None inside of corporation.	By householder ....	By drains .....	None.

VILLAGES.—*Continued.*

Municipality.	Names of M.H.O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Creemore .....	A. S. Kirkland, M.D.	House to house inspection by sanitary inspector.	Diphtheria, 2 cases .....
Cardinal .....	Duncan Gow, M.D.; Wm. Blakely, sanitary inspector.	General house to house inspection takes place once a year.	Typhoid, 4 cases .....
Colborne .....	— Thorburn, M.D., W. H. Smith, sanitary inspector.	Frequent, and when complaints are made.	None .....
Casselman .....	No M.H.O.; G. Pierre, sanitary inspector.	Inspection made at different times during the year.	None .....
Cannington .....	Dr. Gillespie, M.H.O.; Charles Arnott, sanitary inspector.	General inspection twice a year.	Scarlatina, 1 case; typhoid, 5 cases.
Chesley .....	Dr. Cooke, M.H.O.; R. J. Follis, sanitary inspector.	.....	Scarlatina, 20 cases .....
Clifford .....	Dr. Crandall, M.H.O.; H. Torrance, sanitary inspector.	Inspection made twice a year.	Scarlatina, 8 cases, 2 deaths; Diphtheria, a few cases.
Dundalk .....	James McWilliams, M.D.	House to house inspection, and with few exceptions everything was found in a sanitary condition.	Scarlet fever, 4 cases; 2 diphtheria. During the summer months an unusually large number of cases of typhus malaria fever existed.
Durham .....	— Park, M.D.; — McDonald, M.D., sanitary inspector.	General inspection twice a year by sanitary inspector.	Scarlatina, 4 cases, 1 death; diphtheria, 1; 1 death.
Dunnville .....	N. Hopkins, M.D.; M. A. Stearns, sanitary inspector.	House to house inspection in the spring.	Scarlatina, 2; diphtheria, 4; typhoid, 2.
Delhi .....	R. B. Wells, M.D....	Limits of village .....	Scarlatina, 14 cases; 1 death.



## VILLAGES.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
Patients kept isolated in room 40 days.	No; about 200; quite a number vaccinated.	Disinfected under supervision of M. H.O.	One; 4 rooms; attendance, 170.	.....
No isolation hospital; sulphur used to disinfect house and contents; stools disinfected by chloride of lime.	No; 273; no vaccination.	No contagious diseases, save as under 4.	One; 4 rooms; attendance, 56, 60, 59, 98.	169 cubic feet .....
Houses placarded; no hospital.	No; 250; none specially.	Always under the direction of M. D. S.	High school, 2 rooms; No. 1, 40; 2, 25; public school, 4 rooms, 50, 40, 45, 50 respectively.	200 cubic feet.....
None .....	Not compulsory .....	None .....	Two; average attendance, 35, 75 each. <small>school</small> <small>school</small>	.....
No isolation .....	Not compulsory .....	.....	Two schools; 5 rooms.	.....
Usual methods .....	Not compulsory .....	.....	Six schools .....	200 cubic feet .....
No hospital .....	.....	Left to physicians ..	One school .....	.....
Isolation, disinfection and placarding the houses.	No .....	Houses thoroughly scrubbed and carbolic acid used freely.	One; 3; about an average of 40.	230 .....
Placarding houses ..	No .....	Usual methods of disinfection.	One school; 6 rooms; average attendance, 50. <small>school</small>	250 .....
Home isolation; no hospital.	No .....	Under control of medical men in charge.	One high school; 1 public school; 7 rooms; attendance in each as follows: 27, 33, 49, 50, 58, 55, 68.	No. 1, 590; No. 2, 206; No. 3, 151; No. 4, 136; No. 5, 128; No. 6, 144; No. 7, 117.
Room upstairs where all carpets and furniture not required removed; sheet saturated with carbolic solution being over the door; all but nurse excluded from room.	No; about 200; none	Feeding utensils disinfected by boiling water and carbolic solution; clothing by boiling water and chloride of lime, etc.	One; 3 rooms; 50 in each.	.....

VILLAGES.—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Creemore .....	Yes .....	Two factories, 1 planing mill, 1 woollen factory, 5 hands each.	Gravel .....
Cardinal .....	No .....	Edwardsburgh starch factory, 100 hands; stave and barrel factory, 14 hands.	Sandy loam with clay sub-soil.
Colborne .....	None used; verbal notice.	None .....	Wells; clay; gravel .....
Casselman .....	None .....	One farming implement establishment, 4 hands; 2 sawmills, 30 hands.	River and wells; loamy soil.
Cannington .....	Yes .....	One woollen mill, 25 to 30 employees.	Wells; principally clay .....
Chesley .....	Yes .....	Ten or 12 factories and mills.	Wells; clay .....
Clifford .....	Yes .....	Nine factories and mills .....	Wells .....
Dundalk ..	.....	Cheese factory; woollen mill.	All by wells .....
Durham .....	No forms .....	No factories .....	Wells; gravel .....
Dunnville .....	Yes; yes .....	Two sash factories, 14; 1 foundry, 4; 1 machine shop, 8; 1 woollen mill, 20; 1 sawmill, 8; 4 flour mills, 14.	Water supplied to any persons desiring such, but wells are chiefly used; soil, loam; sub-soil, clay.
Delhi .....	Not necessity .....	One canning factory, 125 hands; 1 tannery, 6 hands; glove factory, 8 hands; saw and grist mill, 12 hands; grist mill, 2 hands.	Sandy loam .....

## VILLAGES.—Continued

of dairy cows. Are there medical or veterinary inspection? Give details any examination herds for tuberculosis.	Slaughterhouses. Give number licensed. How drained and how disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so, is there contract removal.	State number and kind of noxious trades. How licensed and regulated? (See sec 63 Public Health Act.)
.....	One; no license; offal fed to pigs.	Householder.....	No sewage system; some dry earth closets.	None.
out 30; no inspector.	No slaughterhouses.	Householder.....	Dry earth closets ...	None.
.....	None .....	By householder ....	No sewage system..	None.
.....	Two not licensed; offal burnt.	By householder ....	Dry earth closets; no contract.	None.
.....	Two; offal carted away.	By contract .....	.....	None.
many cows; no inspector.	.....	By householder ....	Privy pits.....	None.
.....	One slaughterhouse.	By householder ....	.....	None.
seven-five; no .....	None inside corporation.	Buried and put on land by householder.	.....	Cheese factory in a very unsanitary condition said to have caused malarial fever.
dairy cows; no medical or veterinary inspection.	None in corporation.	By householder ....	.....	.....
7; no; none...	None in village.....	Householders .....	Householders; under direction of Board of Health.	None.
.....	None .....	By householder ....	No sewage system..	None.



VILLAGES.—*Continued.*

Municipality.	Names of M.H.O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Drayton .....	R. Lucy, M.D.; D. Roberts, sanitary inspector.	Personal inspection once a year.	Typhoid, 17 cases .....
Exeter .....	T. A. Amos, M.D.; James Creech, sanitary inspector.	Yearly inspection from house to house.	Typhoid, 5 cases .....
Eganville .....	H. Irwin, M.D.; J. C. Pilatzke, sanitary inspector.	Inspection made twice a year	Scarlatina, 4 cases; diphtheria, 3 cases.
Embros .....	J. Ross, M.D.; G. C. McKay, sanitary inspector.	General inspection made once a year.	No contagious diseases during the year.
Elmira .....	H. Ulliyot, M.D.; Henry Heipel, sanitary inspector.	General inspection in May and September.	No contagious diseases .....
Erin .....	H. Greer, M.D.; J. Felker, sanitary inspector.	Sanitary inspector makes an inspection twice a year.	No contagious diseases .....
Hagersville .....	Robert McDonald, M.D., and sanitary inspector.	By Board of Health; 2 inspections.	Scarlatina, 2 cases; typhoid, 8 cases.
Holland Landing .....	Dr. Stephenson, M.H.O.	No general inspection .....	Diphtheria, 5 cases; typhoid, 8 cases.
Hintonburg .....	Dr. Troy, M.H.O.; Thomas Lewis, sanitary inspector.	Thorough inspection during May.	Scarlatina, 11 cases, 8 deaths; diphtheria, 43 cases, 3 deaths.
Huntsville .....	F. L. Howland, M.D.; J. W. Gledhill, sanitary inspector.	House to house inspection ..	Scarlatina, 12 cases; diphtheria, 2 cases; typhoid, 4 cases.
Newburgh .....	M. J. Berman, M.D.; J. M. Taylor, sanitary inspector.	Inspector instructed to make personal visits to all residences.	No contagious diseases, a few cases of malaria.
Norwich .....	E. W. Glover, sanitary inspector.	House to house inspection ..	Typhoid, 22 cases, 3 deaths..

## VILLAGES.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
No hospital .....	No .....	Usual methods ....	One school .....	210 cubic feet ....
.....	No; general in 1894.	.....	One school; 7 rooms attendance, 46 in each room.	270 cubic feet .....
No hospital .....	No vaccination; school children, 223	Carried out under direction of M. H. O.	Two schools .....	About 190' cubic feet.
No hospital; usual methods.	General vaccination in 1894.	Usual methods ....	One school .....	.....
No hospital .....	No .....	.....	One school; 5 rooms.	247½ cubic feet .....
No hospital .....	Yes .....	.....	One school; 3 rooms.	.....
Houses placarded soon as disease is discovered.	Yes; about 230; 20 vaccinated.	By fumigation .....	One public school, 4 rooms, average attendance in each 40. High school, 3 rooms, average attendance 30.	Cannot say .....
Isolated at their own house.	Vaccination has not been compulsory.	.....	Two schools .....	.....
County contagious disease hospital, Ottawa.	No .....	Under supervision of M. H. O.	One public school, 1 separate school.	.....
Small isolation hospital.	N .....	Usual methods ....	One school .....	.....
.....	No; none .....	.....	High and public in one building, 3 rooms in each. High school, 80 in 3 rooms; public, 30 in each room.	.....
No hospital; usual methods.	Vaccination not compulsory; school children, 223; none vaccinated.	Disinfection under supervision of Board of Health.	One school, attendance 200.	200 cubic feet .....

VILLAGES.—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Drayton .....	No forms .....	Two factories, 30 employees.	Wells and springs .....
Exeter .....	No .....	Two planing mills, 8 hands; 1 woollen mill, 4 hands; 1 foundry, 5 hands; 1 flax mill, 20 hands; 1 carriage shop, 4 hands; 1 carriage shop, 3 hands; 1 grist mill, 6 hands; 1 saw mill, 4 hands; 1 tannery, 4 hands.	Spring wells; blue clay and gravel.
Eganville .....	Yes .....		Wells and river; soil, sandy loam.
Embro .....	Yes; both are supplied.	One flax mill, 30 employees.	Wells .....
Elmira .....	Yes .....	Cabinet factory, 10 employees; woollen factory, 10 employees; felt boot factory, 14 employees; foundry, 12 employees.	Wells. soil, clay-loam; sub-soil, gravel.
Erin .....	Yes .....		Wells .....
Hagersville .....	Yes; yes .....	One sash and door factory, 4 hands.	Wells; gravel and clay loam.
Holland Landing .....	No .....	None .....	Wells; good supply of water.
Hintonburg .....	No .....	None .....	Wells .....
Huntsville .....	No .....	One woollen mill, 6 hands; 1 tannery, 75 hands.	Wells .....
Newburgh .....	.....	One carriage shop, 14 hands; 1 foundry, 7 hands; 1 tannery, 4 hands.	Wells and springs of good quality.
Norwich .....	Forms supplied to physicians.	Flour mill, 4 hands; machine shop, 3 hands; cider factory, 5 to 20 hands; broom factory, 10 hands; cooperage, 2 hands.	Wells .....



VILLAGES.—*Continued.*

No. of dairy cows. Is there medical or veterinary inspection? Give details of any examination of herds for tuberculosis.	Slaughterhouses. Give number licensed. How drained and how disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so, is there contract removal.	State number and kind of noxious trades. How licensed and regulated? (See sec. 63 Public Health Act.)
Thirty-seven dairy cows; no inspection.	None .....	Householder .....	No regular system ..	No.
None .....	None in village .....	By householder .....	A few dry earth closets.	None.
.....	None in village .....	By householder .....	.....	None.
About 50 cows; no inspection.	Two; licensed; offal fed to pigs.	By householder .....	Dry earth closets ...	None.
.....	One slaughterhouse.	By householder .....	.....	None.
.....	Two .....	By householder .....	.....	None.
Fourteen; no inspection.	Two; outside of municipality; none licensed.	Carried outside of limits and burned.	Dry earth closets ...	None.
Sixty cows; no inspection.	None .....	By householder.....	Dry earth closets ...	None.
No inspection .....	None .....	By contract .....	Night soil removed by contract.	None.
No inspection; about 80 cows.	None in municipality.	By householder.....	Partly dry earth closets.	None.
.....	One about 40 rods from any building.	By householder.....	All kinds of closets cleaned by householder.	None.
Fifteen cows.....	One slaughterhouse; offal fed to pigs.	By householder.....	A few dry earth closets; chiefly privy pits.	None.

VILLAGES.—*Continued.*

Municipality.	Names of M.H.O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Newcastle .....	A. Farncomb, M.D.	General inspection once a year.	Typhoid, 4 cases .....
Paisley .....	John McMahon, sanitary inspector.	Go over the place personally.	Typhoid, one case .....
Portsmouth .....	R. J. Darrogh, M.D.; F. Mollwain, sanitary inspector.	House to house inspection by sanitary inspector.	None .....
Port Dalhousie .....	J. W. Considine, M.D.	Two or three times yearly...	Diphtheria, 8 cases; typhoid, 1 case.
Port Perry .....	G. H. Clemens, M.D.; Robert McKnight, sanitary inspector.	House to house inspection...	Diphtheria, 5 cases, 1 death; typhoid, 15 cases.
Port Stanley .....	L. I. Mothersell, M.D.; Jas. Payne, sanitary inspector.	House to house inspection...	None .....
Port Elgin .....	Henry Becker, M.D.; George Henry, sanitary inspector.	House to house inspection by inspector.	.....
Point Edward .....	A. N. Hayes, M.D.; Angus McKinnon.	General inspection .....	Diphtheria, 8 cases; typhoid, 22 cases.
Stouffville .....	J. A. Freel, M.D.; Samuel Mighton, sanitary inspector.	House to house inspection ..	Typhoid, 10 cases .....
Sutton .....	T. B. Bentley, M.D.; E. F. Earl, sanitary inspector.	General inspection made of yards, lanes, privies, etc.	Diphtheria, 24 cases, 2 deaths.
Springfield .....	A. F. Tufford, M.D.; Wm. Rivere, sanitary inspector.	Sanitary inspector makes thorough inspection.	Typhoid, 2 cases .....
Stirling .....	J. S. Sprague, M.D.; S. Brown, sanitary inspector.	General inspection .....	.....
Streetsville .....	J. H. Davidson, sanitary inspector.	House to house inspection twice a year.	Diphtheria, 6 cases .....

VILLAGES.—*Continued.*

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895?	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
.....	.....	Usual methods .....	One school .....	Well ventilated ....
Placard and isolate the houses.	No; not many .....	Smoke with sulphur.	One school, 6 rooms; about 60.	.....
Not required .....	Not enforced this year.	No special means ...	Three; 32; 42; 32; 106.	311 cubic feet .....
None .....	None .....	Under the attending physicians' directions.	.....	.....
Separate rooms in upper story if possible; no isolation hospital.	No; 418; no vaccination.	Ordinary means of disinfection employed.	Two buildings; public school average attendance, 268; high school average attendance, 91.	.....
None .....	o; 200; 10 vaccinated.	None required .....	One school, 2 rooms; 55 and 60.	242 cubic feet .....
Isolation at home only.	.....	.....	.....	.....
No hospital .....	No vaccination .....	Usual methods .....	.....	.....
Under care of the members of family.	No; 265; none ....	Carbolic acid and bi-chloride of lime and sulphur fumes.	One; 5 rooms; 50..	More than required space.
No isolation hospital; patients isolated in their homes and houses placarded.	No; 246; between 5 and 21; none vaccinated.	Inmates in some cases are removed; houses disinfected; bedding and clothing burned; sulphur burned, etc.	One school; 3 rooms; average attendance 40, 50, and 60.	560; 290; 240 .....
No isolation .....	Vaccination compulsory.	No disinfection ....	One school; 3 rooms.	.....
No hospital .....	190 children .....	Nothing done .....	One public school; 1 high school.	Public school, 242 feet; high school, 262 feet.
No hospital .....	178 children .....	Disinfection by means of sulphur fumes and steam.	One public school; 1 high school.	Public school, 230 feet; high school, 610 feet.



VILLAGES.—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Newcastle.....			Wells .....
Paisley .....		Two woollen factories .....	Clay soil; gravel sub-soil....
Portsmouth .....	No forms .....	One brewery, 5 hands; 1 forwarding Co., 20 hands; Kingston Penitentiary, 613 inmates; Rockwood hospital, 665.	Wells and lake ... ..
Port Dalhousie .....	Not required .....	Rubber factory, employing 200 hands.	Wells and water from lake ..
Port Perry .....	None supplied this year; none used.	One foundry, 15 hands; 2 planing factories and grist mill, 15 hands.	Wells entirely; clay loam; gravel sub-soil.
Port Stanley .....	No forms supplied ....	One saw-mill and handle factory.	Wells; sandy loam and gravel.
Port Elgin .....	No forms .....		.....
Point Edward .....	Forms supplied .....		Wells .....
Stouffville.....	Printed forms; yes; yes.	Two planing factories, 1 vinegar factory, 1 foundry, about 5 hands in each.	Wells; clay .....
Sutton .....	Supplied to doctors; not always made use of.	Three factories, shingle and saw mills, 10 hands; planing factories, about 6 hands.	Wells; soil sandy sub-soil, clay and gravel.
Springfield .....	No forms .....		.....
Stirling .....	None supplied.....	No factories.....	Wells; clay loam .....
Streetsville .....	Forms supplied to physicians.	No factories .....	Wells; supply good .....

VILLAGES.—*Continued.*

No. of dairy cows. Is there medical or veterinary inspec- tion? Give details of any examination of herds for tuber- culosis.	Slaughterhouses. Give number li- censed. How drained and how disposed of.	Disposal of garbage and night soil, whether by con- tract or only by householder.	Sewage. How dis- posed of, whether by dry earth closets. If so, is there contract re- moval.	State number and kind of noxious trades. How licen- sed and regulated? (See sec. 63 Public Health Act.)
100 cows; no inspec- tion.	One slaughterhouse.	By householder.....	.....	None.
None .....	No slaughterhouses inside corporation.	By householder.....	Some dry earth closets.	None.
Twenty-eight; no ..	None .....	By householder usually.	Chiefly pits; no con- tract.	None.
About 30; no exami- nation.	One; no license.....	By householder.....	None; old closets; no dry earth.	None.
None; no .....	None .....	By householder.....	Pits and dry earth closets; no con- tract removal.	None.
None .....	One; drained into Kettle Creek; offal fed to hogs (boiled).	No contract; by householder.	Chiefly pits; no con- tract.	None.
.....	.....	.....	.....	.....
Twenty-four; no in- spection.	No slaughterhouses.	By householder.....	Number of dry earth closets.	None.
None; no .....	Two; none; no drain- age.	By householder .....	No regular or proper sewage.	None.
102; no examination of herds for tuber- culosis.	Two; well isolated; none licensed; offal fed to pigs after being boiled.	By householder ....	Mostly by dry earth closets.	None.
No cows; no inspec- tion.	One slaughterhouse.	By householder .....	.....	None.
141 cows; no inspec- tion.	Two slaughterhouses.	By householder; great carelessness upon part of house- holder.	No contract removal.	None.
10 cows; no inspec- tion.	Two slaughterhouses; offal fed to hogs.	No contract removal.	Some dry earth clos- ets.	None.

VILLAGES.—*Concluded.*

Municipality.	Names of M. H. O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Tara .....	No M. H. O.; L. G. Briggs, sanitary inspector.	House to house inspection...	None reported.....
Tweed. ....	W. M. Matron, M.D.; Thos. Beatty, sanitary inspector.	House to house visits by sanitary inspector.	Scarlatina, 18 cases; typhoid 1 case.
Teeswater .....	John Gillies, M.D.; A. G. Brown, sanitary inspector.	General inspection.....	Typhoid, 1 case. ....
Thedford .....	W. A. Munns, M.D.; J. Robinson, sanitary inspector.	House to house inspection.....	
Tilbury Centre .....	M. Sharpe, M.D.; G. Keith, sanitary inspector.		
Woodbridge.....	No M. H. O.; George Blake, sanitary inspector.	Sanitary inspector goes from house to house.	None.....
Watford .....	R. A. McHenry, M.D.; A. Mathews, sanitary inspector.	Personal inspection by sanitary inspector.	Scarlatina, 1 case; typhoid 5 cases.
Winchester .....	R. Reddick, M.D.; J. M. Erratt, sanitary inspector.	General inspection made twice a year.	Scarlatina, 6 cases .....
Waterford .....	F. Snider, M.D.; W. B. Goodwin, sanitary inspector.	None .....	
Waterdown .....	Dr. McClenahan; John Smiley, sanitary inspector.	House to house inspection once a year.	Typhoid, 4 cases.....
Woodville.....	John Grant, M.D.....		



VILLAGES.—*Concluded.*

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
None .....	No ; 152 ; none reported vaccinated.	Only private disinfection carried out.	One ; 3 ; about 40 to each room.	Ample .....
No isolation hospital; isolated as well as possible in private houses.	Yes ; about 200 vaccinated.	Sulphur fumes, chloride of lime, carbolic acid, etc. ; wood-work washed.	Two ; senior division, average 33 ; intermediate, 43 ; junior, 49 ; separate, 30.	207 ; 152 ; 146 ; 250 cubic feet respectively.
Houses placarded ; no hospital.	No vaccination .....	.....	Two schools .....	.....
No hospital .....	About 80 children ; 45 children vaccinated.	Disinfection under the direction of the Medical Health Officer.	.....	.....
No hospital .....	.....	.....	One public school ; 1 separate school.	390 cubic feet .....
None .....	About 140 ; no vaccination.	None .....	One school ; 4 rooms ; average 20 to 85...	.....
No isolation hospital; isolation in different parts of the house sent to London General Hospital.	No ; none vaccinated this year.	Burning of sulphur..	One Public School ; 5 rooms ; 40 in each ; 1 High School, 6 rooms.	210.... ..
No isolation hospital.	.....	Usual methods adopted in such cases.	One Public School ..	.....
No hospital .....	No .....	.....	Two schools .....	.....
.....	.....	Under charge of physicians.	One school, 5 rooms ; 60 pupils in each room.	.....
None .....	No .....	.....	One school, 2 rooms ; average attendance in each, 115.	.....

VILLAGES.—*Concluded.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub soil.
Tara .....	None ; no ; no. ....	One foundry, 10 hands ; 1 woollen factory, 5 hands ; 1 roller mill.	From wells ; soil heavy clay
Tweed .....	None supplied .....	One dynamite factory, 2 hands ; 1 cheese factory, 3 hands ; 1 grist mill, 5 hands ; 1 sash and blind factory, 6 hands.	By wells altogether ; gravelly soil with rock bottom.
Teeswater .....	None supplied .....	Two saw mills ; 1 tannery, 3 hands.	Wells .....
Thedford .....			Wells .....
Tilbury Centre .....		One saw mill, 9 hands ; 1 handle factory, 25 hands ; 1 saw mill, 6 hands ; 1 flour mill, 5 hands ; 1 foundry, 3 hands.	Wells ; clay loam .....
Woodbridge .....	None used .....	One woollen mill, 10 hands.	All wells ; clay soil .....
Watford .....	Written notice sent...	One sash and door factory, 10 hands ; 1 foundry, 15 hands ; 1 woollen factory, 5 hands.	Wells, and small waterworks system.
Winchester .....	Yes .....	Two factories .....	Wells .....
Waterford .....			
Waterdown .....	No .....	Two factories .....	
Woodville .....		No factories .....	Wells .....

VILLAGES.—*Concluded*

f dairy cows. ere medical or rinary inspec- ? Give details y examination rds for tuber- sis.	Slaughterhouses. Give number li- censed. How drained and how disposed of.	Disposal of garbage and night soil, whether by con- tract or only by householder.	Sewage. How dis- posed of, whether by dry earth closets. If so, is there contract re- moval.	State number and kind of noxious trades. How licen- sed and regulated? (See sec. 63 Public Health Act.)
; no; none....	None in municipal- ity.	By householder ....	By dry earth closets and privy pits un- der supervision of sanitary inspector.	None.
in municipal-	One; drained into lake; offal buried.	By householder; a dumping ground provided by cor- poration.	By householder ...	None.
.....	Two slaughterhouses.	By householder; privy pits.	.....	None.
ag done in this ter.	None ..	By householder ....	.....	None.
.....	None ..	By householder ....	.....	None.
ay .....	Three; all got per- mission from coun- cil as long as they complied with the requirements; offal drawn away.	By householder ....	Dry earth closets; no contract.	None.
no inspection..	None in corporation.	Carted onto farm property outside village by men em- ployed by house- holder.	Ordinary drainage by sewers.	None.
pection .....	None in corporation.	By householder ....	Principally earth closets.	None.
.....	.....	By householder ....	.....	None.
pection .....	.....	By householder ....	.....	None.
.....	.....	By householder ....	.....	None.



## TOWNSHIPS.

Municipality.	Names of M. H. O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Amaranth .....	F. W. Lewis, M.D. ...	None considered necessary..	Typhoid, 1 case.....
Ashfield.....	James McKay, M.D.; R. A. Carrick, sanitary inspector.	.....	Typhoid, 2 cases, 2 deaths ..
Artemesia .....	J. G. Hutton, M.D....	.....	Scarlatina, 4 cases, 1 death; diphtheria, 10 cases, 2 deaths; typhoid, 1 case.
Athol .....	None .....	None .....	.....
Alnwick.....	J. C. Lapp, M.D.; James Roberts, sani- tary inspector.	Some years house to house inspection. This year only where called upon.	Scarlatina, 2 cases.....
Algona, South.....	James Reeves, M.D.; three sanitary inspect- ors.	.....	Diphtheria, 13 cases, 9 deaths; scarlet fever, 5 cases, 1 death.
Ancaster .....	G. D. Farmer, M.D.; R. O'Hara, sanitary inspector.	House to house in villages, also dairies, slaughter- houses, cow byres, etc.	Scarlatina, 16 cases; diph- theria, 6 cases; typhoid, 7 cases. All not reported.
Arran .....	James Taylor, M.D.; A. Neelands.	Personal inspection .....	Scarlatina, 22 cases, 4 deaths; diphtheria, 5 cases, 1 death.
Anderdon .....	T. J. Park, M.D.; D. Mongeau, sanitary inspector.	Inspection by health officer..	Diphtheria, 2 cases, 2 deaths; typhoid, 2 cases, 2 deaths.
Albemarle .....	— Fisher, M.D.; J. Canoford, sanitary inspector.	No general inspection .....	None .....

## TOWNSHIPS.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
No isolation hospital. Strict isolation of families.	No; 702; from 5 to 16; none reported.	Not satisfactory, except in diphtheria.	Twelve, one room in each.	About 490 feet.....
None .....	No .....	.....	Sixteen; 18 .....	.....
No isolation hospital. Patients are isolated in their homes. Notices are attached to the door.	.....	All refuse burned, bed clothing and wearing clothing are washed in carbolic water, houses thoroughly fumigated with sulphur, woodwork washed with a solution of bi-chloride, and walls all white-washed.	Fourteen schools....	Don't know .....
None .....	No .....	No .....	Seven schools, one room in each.	.....
None .....	No; none .....	Stools disinfected with bi-chloride, also clothes and bedding, walls washed, rooms fumigated with sulphur.	Three; 4 rooms; attendance 35, 35; 2 rooms 65.	270 cubic feet.....
.....	.....	.....	.....	.....
No isolation hospital. Houses placarded and patients isolated as far as possible.	.....	According to rules laid down in pamphlet No. 1.	Fourteen; twelve has one, one has three, and one two.	.....
Quarantined in their dwellings.	Yes; 964; over 300.	.....	Eleven schools, 2 room in one, the others one in each.	.....
.....	None .....	.....	Nine schools, one room.	.....
.....	.....	.....	Eight schools, one room in each.	.....

TOWNSHIPS.—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character soil and sub-soil.
Amarouth.....	None supplied.....	One cheese factory, 3 hands.	Wells chiefly; clay loam soil; gravelly bottom.
Ashfield....	None used.....	Two cheese factories, 2 hands in each.	Wells; soil, clay and gravel.
Artemesia ....	Yes; supplied to M.D.	Two cheese factories; 2 woollen factories; 4 sash and door factories; employees, about 3 in each.	Wells; clay; sub-soil, gravel.
Athol .....	No .....		
Alnwick .....	None .....	None .....	Loam and heavy clay .....
Algona, South.....			
Ancaster .....	Printed forms; when required; they do.	Two cheese factories; 1 lime kiln.	Wells; sand, loam and clay.
Arran.....		Two cheese factories .....	
Anderdon .....	No .....	None .....	Clay sub-soil .....
Albermarle .....	No .....	None .....	Spring, lake and well water.

## TOWNSHIPS.—Continued.

No. of dairy cows. Is there medical or veterinary inspection? Give details of any examination of herds for tuberculosis.	Slaughterhouses. Give number licensed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so, is there contract removal?	State number and kind of noxious trades. How licensed and regulated? (See sec. 63 Public Health Act.)
About 2,000 .....	None .....	Burned by householder.	No dry earth closets.	None.
.....	Two licensed; offal fed to hogs.	By householder .....	.....	None.
Don't know; No....	None licensed; two or three in Township; offal fed to hogs.	By householder .....	.....	Slaughtering of animals not licensed or regulated in any particular way.
.....	.....	.....	.....	.....
No .....	None .....	By householder .....	.....	.....
.....	.....	.....	.....	.....
Inspection by M. H. O.; no bacteriological examination for tuberculosis.	None licensed .....	By householder .....	.....	Cheese factories and dairies are licensed by L. B. H.
.....	Two isolated .....	By householder .....	Partly by dry earth closets.	None.
Two horses had glanders and were destroyed by orders of vet. surgeon.	No .....	No .....	.....	.....
.....	None .....	.....	.....	None.



TOWNSHIPS.—*Continued.*

Municipality.	Names of M.H.O. and sanitary inspector.	State, extent and methods of general inspection.	Contagious diseases.
Aldborough .....	S. Dorland, M.D.; Three sanitary inspectors.	Inspectors make a general inspection and enforce sanitary regulations.	Scarlatina, 6 cases .....
Arthur .....	A. J. Reynolds, M.D.	Ordinary .....	Diphtheria, 10 cases, deaths; typhoid, 4 cases, no deaths.
Admaston .....	T. D. Gilligan, M.D.	.....	Township has been free from any contagious diseases during the year 1896.
Anson and Hindon ...	C. D. Curry, M.D. ....	None, except on complaint being made.	Diphtheria, 6 cases.
Albion .....	Samuel Allison, M.D.	.....	.....
Ameliasburg .....	A. J. File, M.D.; T. H. Thornton; no sanitary inspector.	When complaint is made an enquiry is made by the board.	Scarlatina, 3 cases; diphtheria, 2 cases; typhoid, cases.
Amabel .....	— Campbell, M.D. ....	.....	.....
Assignack .....	No M.H.O.; Wm. Sinze, sanitary inspector.	Inspector is constantly attending his duties.	Diphtheria, 1; typhoid, 1.
Ashpodel .....	P. McNaughton, M.D.	.....	No contagious diseases reported this year.
Barrie Island .....	None .....	None .....	None .....
Burpee .....	J. Johnston, M.D.; Colin Bailey, sanitary inspector.	.....	None .....
Blandford .....	E. Bromley, M.D.; — Wellford, M.D.	.....	None .....
Burgess, N. ....	A. Turner, M.D. ....	.....	.....

TOWNSHIPS.—*Continued.*

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1896.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
Thorough as far as known. No isolation hospital.	In the past; yes....	Carbolic acid vaporized.	Fourteen schools; 20 rooms; average attendance 40.	250 and upwards....
Ordinary .....	No .....	Fumigation, carbolic acid and turpentine.	Fourteen schools; average attendance 35.	.....
No hospital . . . . .	No; 125; none ....	Clothing of no use burned, also bedding boiled and exposed to sulphur fumes.	Two schools; 4 rooms; attendance 15, 30, 35 and 40.	260 feet .....
.....	Not compulsory. Number of school children 780.	.....	Twelve schools .....	.....
Houses where disease exists are quarantined.	Not for the last four or five years. 835. None.	The ordinary methods as ordered by M. H. O.	Fifteen schools; 16 rooms; from 35 to 45 in each.	600 cubic feet. ....
.....	No. None. ....	.....	Fourteen; 13 having one room each.	.....
No hospital. A vacant dwelling is used when necessary.	No. Very few have been vaccinated.	Disinfection is done under Dr. Stephen's instructions.	Six; average attendance 30 in each.	.....
None .....	Don't know .....	Exceptionally healthy.	One; 1 room; about 20.	.....
No hospital; no cases to isolate.	No.; 48.....	.....	Two; 1 room in each.	Don't know .....
No hospital.....	Have been trying to make it compulsory, but find almost impossible.	.....	Six; 1 room in each.	Cannot say.....
.....	.....	.....	Nine .....	.....

TOWNSHIPS.—*Continued.*

Municipality.	Forms of notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Aldborough .....	Yes; when necessary.	Canning factory, from 3 to 100 hands; cheese factory, 5 hands; stovefactory, from 15 to 25 hands.	Wells and creeks; surface water.
Arthur .....	Yes .....	Two cheese factories, 3 hands in each.	Water supply in abundance; soil, clay loam.
Admaston.....	.....	.....	.....
Anson and Hindon ...	No .....	None .....	Sandy loam; sub-soil, gravel and quicksand.
Albion .....	Cannot say.....	None .....	.....
Ameliasburg .....	Yes.....	Four evaporating factories, 10 to 20 hands employed during the season; 5 cheese factories, 3 hands in each.	Wells; clay loam with limestone.
Amabel .....	.....	None .....	.....
Assiginack .....	No.....	One shingle and planing mill, 3 hands.	Sub-soil mostly white clay, mixed with lime stone.
Ashpodel.....	.....	.....	.....
Barr's Island.....	None .....	None .....	Wells; clay loam, clay sub-soil.
Burpee .....	No.....	None .....	Clay soil .....
Blandford .....	No; no .....	None .....	Part of township is sand and part clay.
Burgess, N.....	.....	.....	.....

TOWNSHIPS.—*Continued.*

No. of dairy cows. Is there medical or veterinary inspection? Give details of any examination of herds for tuberculosis.	Slaughterhouses. Give number licensed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so, is there contract removal?	State number and kind of noxious trades. How licensed and regulated? (See sec. 63 Public Health Act.)
Two dairies, 11 cows in each; no veterinary or medical inspection.	Two isolated; drainage good and offal properly disposed of.	Applied as fertilizer; by contract with householder.	No system of sewage in Municipality; disposed of by putting on isolated lands.	.....
Don't know the number of cows.	None .....	.....	.....	.....
.....	.....	.....	.....	.....
225; no inspection; no tuberculosis.	None .....	Householder.....	None .....	.....
.....	None licensed .....	.....	.....	.....
1,500; no .....	Four; none licensed; either buried or burned.	Carefully disposed of by householder.	.....	None in municipality.
None .....	None .....	.....	.....	.....
.....	One; no license ....	By householder.....	No contract .....	None, except one slaughterhouse.
.....	.....	.....	.....	.....
Cows kept by farmers; no regular dairy.	None .....	None; closets cleaned occasionally.	.....	None.
No dairies.....	None .....	By householder.....	.....	None.
None; only a few in Bright kept by private families.	Two or three in the township; no license.	.....	.....	.....
None.....	None .....	.....	.....	.....



TOWNSHIPS.—*Continued.*

Municipality.	Names of M.H.O. and sanitary inspector.	State, extent and methods of general inspection.	Contagious diseases.
Barton .....	H. Bryant, sanitary inspector.	Inspection by the sanitary inspector. Important cases are brought to the notice of board.	.....
Binbrook.....	J. W. Smuck, M.D....	Inspected when complaint is made.	3 cases of scarlatina under notice of M. H. O.
Brunel .....	J. W. Hart, M.D.....	.....	Typhoid, 6 cases.....
Burford .....	Robt. Harbottle, M.B.; D. R. Hamilton, sanitary inspector.	Sanitary inspector has seen a number of butchers and inspected oneslaughter house, and attended to any complaints.	Scarlatina, 2 cases; diphtheria, 1 case; typhoid, 8 cases.
Bangor.....	.....	.....	None .....
Bromley .....	A. J. Sparling, M.D..	There has been no general inspection, and only when complaint is made.	Scarlatina, 2 cases .....
Bentinck.....	No M.H.O.; John Small and Chas. Bohnsack, sanitary inspectors.	Inspection has been general..	Scarlatina, 8 cases; diphtheria, 4 cases; typhoid, a few cases.
Bertie....	Jacob Walrath, M.D.; Jas. J. Moore, A. Ratenburg, George Graham, sanitary inspectors.	Annual inspection in May. Inspection on complaint thereafter.	Scarlatina, several cases; diphtheria, several cases, 5 deaths; typhoid, 5 cases, no deaths.
Brook .....	A. MacKinnon, M.D.; E. Bowlby, sanitary inspector.	Inspection is thorough .....	Scarlatina, some 8 cases; typhoid, a few mild cases.

## TOWNSHIPS.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
No isolation hospital.	No .....	.....	Seven schools; 1 room in each; No. 1, 20 to 25; No. 2, 45 to 50; No. 3, 48 to 52; No. 3, union, 25 to 30; No. 4, 40 to 45; No. 5, 40 to 45; No. 6, 50 to 55.	From 130 feet to 1,000.
No hospital; home isolation.	No; about 300; none vaccinated.	Bichloride disinfectant under direction of M.H.O.	Six schools, 7 rooms.	.....
No hospital; M.H.O. attends to this matter.	Not this year; last year 348.	.....	Seven; about 50	.....
The physicians attending patients isolate them as best he can.	No .....	Usually by washing and house cleaning generally.	Twenty-five schools; usually 1 room.	Don't know .....
.....	.....	.....	Five; five rooms; No. 1, 20; No. 2, 30; No. 3, 58; No. 4, 18; No. 5, 53.	Average 144 .....
Placards placed on house and visitors excluded.	No vaccination done this year.	Houses thoroughly washed; disinfected generally by burning sulphur, etc.	.....	.....
No isolation hospital; contagious diseases are isolated by sanitary inspector and attending physician.	No compulsory vaccination; number of school children 1,711.	Attending physicians give instructions as to the mode of disinfection.	Thirteen schools; 19 rooms.	Cannot give .....
Placards; schools closed; isolation of households affected.	No vaccination, by order of board this year.	M.H.O. orders the clothing and bedding disinfected and boiled; stools buried after disinfection; rooms fumigated; lime and carbolic acid used freely. In diphtheria, anti-toxine was used by some physicians with apparent success in some cases.	Twelve schools; 15 rooms.	.....
Not necessary in 1895.	No; about 1 in 5 is vaccinated.	.....	Nineteen schools; 20 rooms.	.....

TOWNSHIPS.—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Barton .....	No.....	None .....	Clay loam, rock bottom .....
Binbrook.....	Yes.....	.....	Wells ; clay loam.....
Brunel.....	.....	None .....	Sandy loam ; hard pan and rock.
Burford.....	Physicians supplied ; teachers send a post card to M.H.O.	One canning factory, employing from 6 to 100 hands.	Usually wells .....
Bangor .....	.....	One cheese factory ; two hands.	Clay loam and hard pan ....
Bromley .....	.....	.....	.....
Bentinck.....	Supplied to physicians ; no ; they notify personally or by post card.	One furniture factory, 1 felt boot factory, one spring bed factory ; about 200 employees.	Wells ; spring creeks ; soil clay loam ; sub-soil gravel and sand.
Bertie .....	Not generally used....	No factories.....	Wells ; many of them are drilled in the rock ; others in variable soil.
Brook.....	.....	.....	All wells .....

## TOWNSHIPS.—Continued.

No. of dairy cows. Is there medical or veterinary inspection? Give details of a ny examination of herds for tuberculosis.	Slaughterhouses. Give number licensed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so, is there contract removal?	State number and kind of noxious trades. How licensed and regulated? (See sec. 63 Public Health Act.)
Cannot say ; no veterinary inspection.	Ten ; offal in some cases boiled and fed to pigs.	.....	Common privies ....	None.
Farm herds ; no inspection.	One ; not licensed...	Individual disposal by householder.	.....	None.
No large herds ; only a few kept by farmers.	None.....	Householder.....	Dry earth closets ..	.....
No medical inspection ; veterinary inspection when owner suspects anything wrong.	Variable numbers, according to season ; none licensed.	Buried, or used as land manure by householder.	No sewage system ..	Slaughterhouses ; none licensed or regulated.
No veterinary inspection.	One ; not licensed ; drained into a creek.	By householder.....	None.....	None.
.....	.....	.....	.....	.....
None in the township.	Two ; none licensed.	By householder.....	None.....	None.
But few dairy cows ; no special inspection.	None licensed ... ..	By householder.....	No system.....	None.
.....	One.....	.....	.....	.....



TOWNSHIPS.—*Continued.*

Municipality.	Names of M. H. O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Bosanquet.....	D. McEdwards, M.D.	Inspected cheese factories and slaughter houses.	Scarlatina, 16 cases, 1 death.
Barrie.....	— Caldwell, M.D.....		Not any.....
Bexley .....	C. N. Laurie, M.D .....		
Beverly .....	J. T. Manes, M. D.; E. Clement, sanitary inspector.	No regular methods of inspection only when the inspector or M. H. O. are notified.	Typhoid fever, 34 cases .....
Blenheim .....	Have a M. H. O., but no sanitary inspector.	Township is divided into three divisions and the board into three committees.	Diphtheria, 13 cases, 1 death; typhoid, 38 cases, 1 death.
Brock .....	McDermott & Jardine, M.D's.; R. R. Bryant, sanitary inspector.	Inspection made twice during the summer, and other times if required.	Scarlatina, one case; diphtheria, four cases; typhoid, three cases.
Bedford .....	Wm. Parker, M. D .....		Diphtheria, one case.....
Binbrook ....	J. W. Smuck, M.D....	Inspection when complaints are made .....	Scarlatina, three cases, under notice of M. H. O.
Carrick .....	R. E. Clapp, M.D.; Wm. Clenheim, sanitary inspector.	House to house inspection of all villages, school houses, creameries, etc.	Diphtheria, a few cases; typhoid, about 20 cases.
Carlow .....			
Cockburn Island.....	None .....		None .....

## TOWNSHIPS.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
Isolated in homes...	Yes; nearly all vaccinated.	Stools buried after disinfection; after convalescence sulphur is burned in rooms infected.	Thirteen; one room in each.	.....
Not any....	No vaccination this year.	Not any.....	Seven schools; 1 room in each; attendance from 15 to 25 in each school.	.....
Isolated in their houses; no hospital.	Yes.....	Houses placarded, and inmates not allowed to mingle with the public.	Six schools, 1 room, average attendance from 12 to 40.	.....
No isolation hospital.	No.....	The usual disinfectants, carbolic acid, chloride of lime, etc. All rooms are disinfected; secreta is disinfected before being disposed of.	Fifteen schools, 13 of these have 2 rooms.	Don't know.....
No isolation hospital; houses are placarded; visitors not allowed to visit.	Don't know number vaccinated; 998 in municipality; vaccine was supplied the physicians in 1894.	Cannot say.....	Seventeen schools, 21 rooms.	Cannot say.....
No isolation hospital; don't allow any person to mingle with families having contagious diseases.	No; none.....	Thorough isolation of all cases.	Nineteen; 22; average 45.	.....
None required.....	No; about 600; none in 1895.	.....	Twelve; 6 has 2 rooms, 6 has 3 rooms.	About 350.....
No hospital; home isolation.	No; about 800; none vaccinated.	Bichloride under direction of M. H. O.	Six; 7 rooms.....	.....
No isolation hospital; isolation from the other members of the family.	Yes; about 100....	Fumigation and disinfection.	Twenty; 27; not known.	Not known.....
No hospital.....	No; 94.....	.....	Four; 4; from 10 to 20.	.....
.....	No vaccination performed.	.....	Two; 1 room in each.	400 in No. 1, 350 in N2, 2.

TOWNSHIPS.—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Bosanquet.....	Yes; yes... ..	One cheese factory; 3 hands employed.	Clay loam.....
Barrie.....	Not any supplied.....	None but cheese factories; 2 to 4 hands in each.	Good water supply; sandy soil.
Bexley .....	Not required .....	Not any.....	Loamy and clay sub-soil ....
Beverley .....	Not supplied .....	None .....	From wells; clay soil; nearly all wells are rock drilled.
Blenheim .....	Physicians supplied; some use them.	One cheese and 1 chair factory.	Soil, sandy loam; sub-soil, clay and gravel.
Brook .....	Yes; yes .....	Two factories, 4 in each.....	Wells; clay and gravel .....
Bedford .....	.....	.....	Wells; mostly clay soil ....
Binbrook .....	Yes .....	A rural municipality.....	Wells; clay loam .....
Carrick .....	None; no; notice in writing is given.	One factory and a few employees.	Wells; clay soil and quick sand.
Carlow .....	No; no .....	One cheese factory.....	Mostly wells; loam and hardpan.
Cockburn Island.....	No .....	None .....	Some running creeks, others use wells.

## . TOWNSHIPS.—Continued.

No. of dairy cows. Is there medical or veterinary inspection? Give details of any examination of herds for tuberculosis.	Slaughterhouses. Give number licensed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so, is there contract removal?	State number and kind of noxious trades. How licensed and regulated? (See sec. 63 Public Health Act.)
Cattle free from disease.	One; not licensed .....	.....	.....	.....
About 400 cows; no inspection.	No slaughterhouses ..	By householder.....	.....	.....
No large dairies; no inspection or examination.	None .....	By householder ....	Common closets above ground. ....	.....
Don't know number; no inspection.	Three on small scale; offal burned.	By householder ....	No contract removal. ....	.....
Cannot give number; no examination of herds for tuberculosis.	None licensed; offal fed; used as manure.	By householder ....	.....	.....
Each farmer has from 6 to 12 cows; no O. S. inspection.	One; none; buried.	By householder; burnt and buried.	Privy pits, some dry earth closets. ....	.....
One dairy, 40 cows; no inspection.	None .....	By householder ....	Dry earth .....	.....
Farm herds; no inspection.	One not licensed....	Individual disposal by householder.	.....	.....
.....	Four; 4; burned ..	Buried by householder.	Dry earth closets in villages.	None.
500; no .....	None .....	Householder.....	No contract removal.	None.
No inspection .....	None .....	Householder.....	.....	.....



## TOWNSHIPS.—Continued.

Municipality.	Names of M. H. O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Cartwright .....	W. A. Fish, M.D. ....	Members of Board inspect twice a year.	None ... ..
Claradon and Mills ..	None .....	None .....	None .....
Charlottenburg .....	Falkner, M. D.; L. Cattanaugh, sanitary inspector.	Creameries, cheese factories and slaughterhouses are carefully inspected.	Diphtheria, 1 case, 1 death ..
Culross .....	Gillies, M.D. ....	.....	Diphtheria, 5 cases, 2 deaths.
Charlotteville .....	W. J. McInnis, M.D.; A. Wood and T. L. Roberts, sanitary inspectors.	.....	None reported .....
Clarence .....	N. Desrosiers, M.D. ..	General inspection every spring.	Scarlatina, 100 cases, 25 deaths; diphtheria, 40 cases, 8 deaths; typhoid fever, 200 cases, 3 deaths.
Caistor .....	De La Malter, M.D.; Ed. Gillespie, sanitary inspector.	Attended to by sanitary inspector.	Diphtheria, 5; typhoid, 2 ..
Crosby, North.....	D. E. Foley, M.D.; Owen Martin sanitary inspector.	Sanitary inspector makes inspection in the spring and special when complaint is made.	Scarlatina, 1 case .....
Chaffey .....	F. L. Howland, M.D.; W. H. Lehman, sanitary inspector.	.....	Scarlatina, 4 cases, 1 death; diphtheria, 4 cases, 2 deaths.
Collingwood.....	S. H. Large, M.D.; E. Dickinson, sanitary inspector.	Personal inspection by sanitary inspector.	Typhoid, 6 cases.....
Chapman .....	P. D. Tyreman, M.D..	All members of the board acting sanitary inspectors.	None .....
Christie .....	J. P. Waddy, M.D. ...	Township is divided into districts, each member looks after his division.	Diphtheria, 11 cases .....
Cardwell .....	Robinson, M.D. ....	.....	None .....

## TOWNSHIPS.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil,
By placarding premises and prohibiting children from attending school.	No vaccination performed.	By using chloride of lime; burned sulphur.	Nine schools, 1 room in each, attendance from 25 to 40.	.....
No hospital .....	None .....	None .....	Eight; eight. ....	.....
No hospital; no....	No .....	Sulphur fumigation.	Twenty - three; 21 have one room and 2 have 2 rooms each.	.....
No hospital; houses placarded, etc.	No; don't know....	.....	Eleven schools, 1 room in each.	.....
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
None; isolation by placarding houses.	No .....	By disinfecting the discharge of bowels, etc.	Nine; nine .....	.....
No, excepting placarding houses.	No .....	.....	Twelve .....	.....
No hospital .....	Generally done in 1894, none in 1895.	Chloride of lime and sulphuric acid.	Ten, 1 room in each. ....	.....
None; no hospital..	No .....	Sulphur fumigation; washing walls and floors with bichloride, etc.	Sixteen schools; 17 rooms.	.....
None; none.....	No; about 240 school children; about 25.	No contagious diseases in 1895.	Three; 3 rooms, attendance 15, 30, 75.	381 .....
No hospital; houses placarded and isolated.	All children were vaccinated in 1894; number of school children, 80.	Houses are disinfected with sulphur under supervision of member of Board of Health.	Four; 4; attendance No. 1, 3; No. 2, 25; No. 3, 2; No. 4, 14.	230 .....
.....	No; 68 in municipality.	.....	Three, 1 room in each.	.....

## TOWNSHIPS.—Continued.

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Cartwright .....	Forms supplied and used.	None, except one cheese factory.	Wells used; clay soil and sub-soil.
Claradon and Mills .....		Two .....	
Charlottenburg .....	Yes .....	None .....	Generally clay soil .....
Culross .....		Two or three butter and cheese factories, employing one or two hands in each.	Wells .....
Charlotteville .....			
Clarence .....		Thirteen; seventeen .....	Wells .....
Caistor .....	Yes; yes .....	One cheese factory, three employees.	Wells: clay loam .....
Crosby, North .....	Yes .....	Four cheese factories, 2 hands in each; 1 crist mill, 8 hands; 1 saw mill, 8 hands; 1 furniture factory, 5 hands.	Wells; sandy loam, sub-soil, clay and gravel.
Chaffey .....	No; no .....	None .....	
Collingwood .....		One woollen factory; one cheese factory employing 15 hands.	Wells; chiefly gravel .....
Chapman .....	No forms .....	One sash and door factory, 2 hands; 2 saw mills, 10 hands each; 2 shingle mills, 10 hands each.	Wells and springs; soil clay.
Christie .....	No forms .....	Three saw mills, employing 25, 8, 5 hands respectively; 1 sash factory, 2 hands.	Wells are used; loam with clay sub-soil.
Cardwell .....	No .....	None .....	Wells ....

## TOWNSHIPS.—Continued.

No. of dairy cows. Is there medical or veterinary inspection? Give details of any examination of herds for tuberculosis.	Slaughterhouses. Give number licensed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so, is there contract removal?	State number and kind of noxious trades. How licensed and regulated? (See sec. 63 Public Health Act.
No veterinary inspection.	No slaughterhouses.	By householder.....	By dry earth closets; no contract removal.	None.
No inspection .....	None .....	.....	.....	None.
9,164 cattle; probably about 6,000 dairy cows; no inspection; no examination of herds.	Not more than 2 in municipality.	By householder ...	No system of sewage.	None.
Cannot give the number of cows.	Two or three slaughterhouses.	.....	.....	.....
.....	.....	.....	.....	.....
.....	Not licensed; are in bad condition.	.....	.....	.....
About 1,700; no....	Four; no licenses; offal fed to hogs.	By householder ...	By dry earth closets.	None.
.....	One; drained to lake; offal burned.	By householder ....	No .....	.....
None .....	Two; offal fed to hogs.	.....	.....	.....
Nineteen dairy cows; no.	Four slaughterhouses, all licensed; offal disposed of on farm lands.	.....	.....	.....
About 400; no; none.	None .....	By householder ....	Dry earth closets and cess pools.	None.
No dairies.....	One slaughterhouse.	By householder ....	.....	.....
.....	None .....	.....	.....	None.



## TOWNSHIPS.—Continued.

Municipality.	Names of M. H. O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Caledon.....	James Algie, M.D....	Regarding nuisances, the M. H. O. finds less trouble from year to year; one slaughterhouse nuisance satisfactorily abated; hog pens, 4 removed; dead animals, 6 buried.	Diphtheria, 8 cases, 2 deaths; typhoid, 6 cases, 1 death; scarlet fever, 6 cases, no deaths.
Crowland .....	S. H. Glasgow, M.D.; Michael Doan, sanitary inspector.	Inspector attends to all complaints.	Scarlatina, 1 case; diphtheria, 1 case; typhoid, two cases, 2 deaths.
Caldwell .....	None .....	.....	None reported.....
Clarke .....	None appointed .....	Township is divided into five districts, 1 member of the Board having the oversight of each.	Scarlatina, 8 cases; diphtheria, 2 cases, 1 death; typhoid, 2 cases, 1 death.
Cumberland.....	James Ferguson, M.D.; Peter A. McLaren, sanitary inspector.	No general inspection, only when complaint is made.	Scarlatina, 10 cases; diphtheria, 12 cases, 2 deaths; typhoid, 6 cases.
Cardiff.....	W. Giles, M.D .....	Inspection when necessary ..	Diphtheria, 9 cases, 4 deaths.
Dawson .....	None .....	None .....	None .....
Downie .....	J. J. Paul, M.D.....	All schools, cheese factories, slaughterhouses, wells and closets were inspected.	About 12 cases diphtheria and 24 cases typhoid, 2 deaths from the latter.
Dungannon.....	— Lavett, M.D.....	None .....	None .....
Dunn .....	N. Hopkins, M.D .....	.....	None reported.....
Dalhousie and Sherbrooke .....	A. Bradford, M.D....	None .....	Scarlatina, 4 cases .....

## TOWNSHIPS.—Continued.

Isolation of contagious diseases. State methods and whether any isolation demanded.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1896.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
	Generally so .....		Eight schools; 8 rooms.	Don't know .....
No hospital .....	None .....		One; one.	228 cubic ft. ....
All cases isolated as well as circumstances would permit by the physician in attendance.	No; number of children from 5 to 16, 719; from 16 to 21, 244—963.	Physician attends and orders removal of all clothing, bedding, etc., and the boiling disinfection of same. House fumigated with sulphur, repapered and whitewashed.	Nineteen; only one has 2 rooms.	No means of knowing
No hospital; isolation in private houses only.	No; about 900; vaccination neglected.		Sixteen; only 4 have 2 rooms.	Much less than sanitary science would demand.
Houses placarded...	No .....	Sulphur burned, carbolic acid solution used.	One; 1. ....	
None .....	None .....	Don't know ..	One school; 1 room; about 15.	
Board causes families to be isolated where diphtheria appears.		M. H. O. disinfected all premises where contagious diseases existed.		
None .....	No; 338; age from 5 to 16, —.	None .....	Seven; average attendance, 35.	
No hospital .....	Don't know of any..	Free use of carbolic acid.	Five; 5; attendance, 30, 33, 35, 38, 40.	About 400 feet .....
None; no isolation hospital.	No; 300; don't know		Twelve; 1 room in each school; average, about 25.	Don't know .....

TOWNSHIPS.—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Caledon .....			
Crowland .....	All cases promptly reported.	None .....	Wells and cisterns.....
Caldwell .....		None .....	Wells .....
Clarke .....	To physicians and used by them; none to teachers.	Two cheese factories .....	Wells; varies greatly .....
Cumberland.....	No; no .....	No factories .....	Gravel and clay .....
Cardiff .....	No .....	One cheese factory.....	Wells or creeks.....
Dawson .....	Don't know .....	One saw mill .....	Wells; gravel and clay .....
Downie .....			
Dungannon.....	None .....	Three cheese factories.....	Yellow loam, sandy bottom.
Dunn .....	Supplied to M. H. O..	One cheese factory.....	Clay soil, sub-soil clay loam.
Dalhousie and Sherbrooke .....	No forms supplied ....	Four cheese factories, 2 men in each.	Wells and springs; sandy loam.

TOWNSHIPS.—*Continued.*

No. of dairy cows. Is there medical or veterinary inspec- tion? Give details of any examina- tion of herds for tuberculosis.	Slaughterhouses. Give number li- censed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by con- tract or only by householder.	Sewage. How dis- posed of, whether by dry earth closets. If so, is there contract re- moval?	State number and kind of noxious trades. How licen- sed and regulated? (See sec. 63 Public Health Act.)
No cases of tuber- culosis.	None .....	Householders .....		
No dairies.....	Three; no license; fed to hogs.			None, except slaugh- terhouses.
About 600 cows. ...	No regular ones; no license; no drains; no inspection.	Householder.....	Some dry earth closets.	None.
No inspection .....				
A few cows kept by farmers; no dairy.				
525 cows; no; none.	The house is built on a high plane and all refuse is washed away.	None .....		None.
1,000; no inspection; no herd examined.	None .....	By householder ....	Pit system .....	None.
Don't know; no; none.	None .....	Householder.....	Dry earth closets; no contract.	None.



TOWNSHIPS.—*Continued.*

Municipality.	Names of M. H. O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Dover.....	J. S. Agar, M.D.....	No general inspection carried out.	Diphtheria, 15 cases, 1 death; typhoid, 50 cases, only 2 deaths reported.
Denbigh, Abinger and Ashby .....	C. D. Doig, M.D. ....	No official inspection this year.	None .....
Dorchester, S. ....	Milton Baker, M.D.; Peter Carlton, sanitary inspector.	.....	Diphtheria, 7 cases, 3 deaths; typhoid, 1.
Douro.....	J. H. Fraser, M.D....	No systematic inspection of premises.	Three cases typhoid, the result of bad water; 1 case diphtheria, 1 death; 6 cases scarlet fever, 2 deaths.
Darlington .....	— Mitchell, M.D.....	Reports of medical men and complaints of people.	Scarlatina, 9 cases; diphtheria, 12 cases, 3 deaths; typhoid, 10 cases, 1 death.
Dereham .....	H. Minishall, M.D.; J.K.Creighton, M.D.	By sanitary inspector, who attends promptly to all complaints.	Scarlatina, 20 cases; diphtheria, 5 cases; typhoid, 12 cases, one death.
Dumfries, N.....	D. A. Thomson, M.D.; John Macnab, sanitary inspector.	Slaughterhouses and milk vendors are inspected once a year.	Typhoid, 9 cases, 1 death ...
Draper.....	S. Bridgeland, M.D....	.....	Diphtheria, 2 cases .....
Dorchester, N.....	A. Graham, M.D.....	.....	Typhoid, 1 case .....
Dawn .....	— Galbraith, M.D.....	.....	None .....
Darling .....	.....	No inspection made.....	None .....
Deleware .....	F. H. Mitchell, M.D...	House to house inspection...	Typhoid, 12 cases .....

## TOWNSHIPS.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
No isolation hospital; patient is kept in a separate room and others kept as far as possible from communication with him.	No; about 500 in municipality.	Patients given bath; clothing soaked in bichloride solution; house fumigated with sulphur.	Eleven; average attendance, upwards 40.	.....
No hospital; no diseases to isolate.	No .....	No disinfection required.	Seven; 7 rooms .....	.....
.....	Compulsory vaccination in all the schools; about 150 vaccinated last February.	According to rules laid down in Public H. Act.	Eleven; 15. ....	.....
.....	.....	.....	.....	.....
Placarding in some cases.	No .....	Each medical man attends to this himself, using carbolic acid, etc.	Nineteen schools, all 1 room; attendance from 8 to 50; average, about 18.	From 20 to 40 cubic feet.
The best that can be done under the circumstances, each case requiring different methods.	No; during the year probably 99% have been vaccinated. Total number of school children in municipality, 894.	By the use of antiseptics, while washing and scrubbing, burning sulphur, and in some cases burning of bed linen, etc.	Eleven; 4 have 2 rooms each; about 550 in tp.	.....
.....	Not compulsory; about 550 children.	.....	Eleven, majority have 1 room.	Don't know .....
.....	.....	.....	Eight .....	.....
Disinfected by M. H. O.	None .....	None .....	.....	.....
None; not required.	.....	.....	Sixteen .....	.....
None .....	Don't know .....	None used .....	Six; 1 room in each.	Don't know .....
.....	No; 280 school children; all vaccinated in 1894.	Ordinary precaution observed.	Seven; 8 rooms .....	320 .....

TOWNSHIPS.—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Dover.....	Neither .....	None .....	Wells; heavy clay with quick-sand sub-soil.
Denbigh, Abinger and Ashby ..	None used.....	Two cheese factories, one hand in each.	Springs and wells; sandy loam, gravelly sub-soil.
Dorchester, S.....		Three cheese factories .....	
Douro .....			
Darlington .....	None used.....	Two cheese factories, two hands in each.	Wells entirely; clay, sand and loam, sub-soil, gravel.
Dereham .....	Don't know .....	Nine cheese and butter factories, 8 hands in each.	Soil generally clay.....
Dumfries, N.....		Two cheese factories, 2 employees in each.	Soil is principally clay, sandy loam, sub-soil, gravel.
Draper .....		None .....	
Dorchester, N.....	M. H. O. use them...	Six cheese factories, employing 22 men.	Wells and springs .....
Dawn.....	None; no; ne... ..	One cheese factory.....	Wells; clay with gravel sub-soil.
Darling .....	Don't know .....	One cheese factory; 2 hands.	Soil is mostly light .....
Deleware.....	Yes; yes.....	Two factories; 45 hands ....	Wells; gravel .....

TOWNSHIPS.—*Continued.*

No. of dairy cows. Is there medical or veterinary inspection? Give details of any examination of herds for tuberculosis.	Slaughterhouses. Give number licensed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so, is there contract removal?	State number and kind of noxious trades. How licensed and regulated? (See sec. 63 Public Health Act.)
No dairy .....	None .....	Householder.....	Pit system .....	None.
Don't know number of cows.	None .....	Householder.....	No prescribed system; no contract removal.	None.
Don't know .....	One small one; a portion fed to hogs and balance on ground as manure.	By householder ....	By householder ....	None.
Our sanitary inspector is a V. S.; no estimate can be made of the number of cows.	Four slaughterhouses all licensed; tile drained into a safe distance.			
About 510; no inspection.	Seven; licensed; offal is fed to hogs part boiled and part raw.	By householder ....		
About 4,500 in tp.; no inspection needed.	Four slaughterhouses.	Householder.....	Mostly dry earth closets.	
Don't know .....	None .....	By householder ....		
About 500 dairy cows.	Two; offal fed to hogs.	By householder ....	Natural drainage....	None.



TOWNSHIPS.—*Continued.*

Municipality.	Names of M. H. O. and sanitary inspector.	State extent and method of general inspection.	Contagious diseases.
Eldon .....	John F. Ross, M.D. ....		Two cases diphtheria, 2 deaths.
Essa .....	J. W. Norris, M.D. ....	Each village is inspected by at least two members of the Board.	Typhoid, 3 cases, 1 death....
Egermont .....	A. L. Brown, M.D. ....	The township is divided into four parts and an inspector appointed for each division.	Scarlatina, about 20 cases; diphtheria, 4 cases, 2 deaths; typhoid, 7 cases.
Edwardsburg .....	S. C. McLean, M.D.; T. H. Barton, sanitary inspector.		None this year.....
Easthope, South.....	Dr. Robert Whiteman.		Diphtheria, 2 cases, 1 death; typhoid, 1 case.
Esquesing .....	No M.H.O.; D. McGuire, sanitary inspector.	General inspection is made in the month of May.	None reported .....
Erin .....			A number of cases of typhoid fever have occurred during the year; a few cases of diphtheria, 2 deaths.
Elma .....	Thomas Douglas, M.D.	No general inspection; inspection only when complaint is made.	Smallpox, 1 case; diphtheria, 12 cases, 2 deaths; a few mild cases of typhoid.
Euphrasia .....	T. E. Bennett, M.D. ....	Not to any great extent....	Typhoid, 3 cases, 1 death....
Zorra, East .....	A. N. Holston, M.D.; James D. McKay, sanitary inspector; Geo. Hotson, sanitary inspector.	Each inspector makes two visits to all factories, schools, slaughterhouses, etc., in his division, and attends to any complaints.	Scarlatina, 2 cases, 1 death; diphtheria, 4 cases, no deaths; typhoid, 4 cases, 1 death.
Emily.....	V. Cornwall, M.D. ....	None .....	Scarlatina, 3 cases, 1 death; diphtheria, 14 cases.

## TOWNSHIPS.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
No isolation .....	No compulsory vaccination; 357 school children in municipality.	.....	Ten schools .....	.....
None needed this year.	No; don't know; quite a number.	None used by Local Board.	Thirteen in tp.; 2 of these have 3 departments, 1 in Cookstown and 1 in Angus.	Don't know .....
No isolation hospital; patients removed to remote parts of the house; in all cases isolation is carried out far as possible.	No; children from 5 to 16, 905; from 16 to 21, 311. Can't say how many vaccinated.	Bed clothes, etc., washed in solution bi-chloride; fumigation with sulphur.	Fourteen schools; 1 has 2 divisions.	Don't know .....
No hospital .....	Not compulsory ....	None .....	Twenty-one; 22 rooms; average in each, 47.	From 88 to 478; average 200 feet.
House quarantined; no isolation hospital.	No .....	By carbolic acid and bi-chloride of lime.	Six schools; 1 room in each, with one exception.	200 .....
None .....	No .....	.....	.....	.....
.....	.....	.....	.....	.....
All cases isolated at home; all persons are prevented going to the premises.	Not made compulsory, but a large number of children were vaccinated.	Followed instructions laid down by Provincial Board of Health.	Twelve schools; 1 room in each.	.....
No hospital ..	No .....	To no great extent..	Number of schools, 20; rooms, 22.	.....
None; no .....	Not compulsory; 1,157; cannot say.	House thoroughly cleaned under direction of Inspector; carbolic acid in water and chloride of lime freely used; clothing and bedding washed and fumigated; all excreta buried or burned.	Fourteen; mostly 1 room; average attendance 42.	Enough to satisfy School Inspector.
Patients isolated in dwellings, which are placarded.	No; 602 on rolls; none vaccinated.	The directions on pamphlet No. 15 carried out.	Twelve schools; 1 room in each; average attendance 20 in each.	440 .....

TOWNSHIPS.—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Eldon.....	.....	.....	.....
Essa .....	None .....	None .....	Clay soil mostly, and water in most cases pure.
Egermont.....	Not supplied .....	One creamery and 2 cheese factories; 1 employee to each.	Abundant supply of water; loam, gravel and clay.
Edwardsburg .....	No .....	No factories .....	Wells; principally clay and rock.
Easthope, South.....	Supplied to all M.D.'s.	One pump factory, 8 hands; 1 woollen mill, 10 hands; 1 furniture factory, 12 hands; 1 furniture factory, 8 hands.	Wells and some natural springs.
Esqueusing.....	No .....	.....	Wells principally.....
Erin .....	.....	.....	Wells generally; samples of water were examined in the vicinity of Hillsburg and found unfit for use unless boiled.
Elma .....	None supplied .....	.....	Soil, clay loam; limestone sub-soil.
Euphrasia.....	Supplied to M.H.O....	One cheese factory, 2 employees.	Wells; rock, clay and sand.
Zorra, East .....	Yes .....	One cheese factory, 7 hands.	Wells solely; all kinds of soil; water good.
Emily.....	Supplied to physicians only.	None .....	Well water is used.....

## TOWNSHIPS.—Continued.

No. of dairy cows. Is there medical or veterinary inspec- tion? Give details of any examination of herds for tuber- culosis.	Slaughterhouses. Give number li- censed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by con- tract or only by householder.	Sewage. How dis- posed of, whether by dry earth closets. If so, is there contract re- moval.	State number and kind of, noxious trades. How licen- sed and regulated? (See sec. 63 Public Health Act.)
.....	.....	.....	.....	.....
No large dairies; the farmers supply villages with milk.	None licensed, and the Board have a good deal of trouble in making owners keep them clean.	Have these things at- tended to.	Mostly privy pits; some beginning to use dry earth closets.	.....
Cannot tell number of dairy cows; no inspection.	None licensed .....	By householder ....	Dry earth closets; no contract re- moval.	.....
.....	None licensed .....	.....	.....	.....
About 1,500; no in- spection.	Three; none licen- sed; think all offal is fed to hogs.	Burn garbage; night soil buried.	.....	.....
Don't know of any..	By householder.....	.....	.....	.....
.....	.....	.....	.....	.....
Don't know; no in- spection.	Four; none licensed.	.....	.....	.....
No in pecton .....	Two; no license ....	.....	.....	.....
Cannot say; some few cases of tuber- culosis.	Three in township; offal put on land.	In villages cleaned out twice a year.	.....	.....
No inspection .....	None .....	Householder....	.....	.....



TOWNSHIPS.—*Continued.*

Municipality.	Names of M. H. O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Erneston .....	J. A. Mabey, M.D.; G. Ferguson, sanitary inspector.	Inspection of suspected premises and of all places complained of.	Scarlatina, 1 case; diphtheria, 5 cases, 2 deaths; typhoid, probably, 15 cases, 3 deaths.
Ekfrid .....	L. Hyttenranch, M.D.	When complaints are made the premises are inspected.	Typhoid, 1 case .....
Elderslie .....	No M.H.O.....	Members of Local Board of Health are appointed sanitary inspectors in divisions.	Scarlatina, 4 cases, 1 death; diphtheria, 2 cases.
Faraday .....	Green, M.D., M.H.O.; Thomas Stanger, sanitary inspector.	.....	None .....
Fi zroy .....	W. A. Kyle, M.D.; E. W. Evans, sanitary inspector.	.....	Scarlatina, 16 cases, 1 death; diphtheria, 33 cases, 9 deaths.
Ferris .....	J. B. Carruthers, M.D.; A. Gendreau, sanitary inspector.	Each member of the board to report any contagious disease.	Typhoid, 1 case .....
Fredricksburg, N.....	None .....	Each member looks after his own vicinity.	Typhoid, 1 case .....
Fullerton .....	W. E. Armstrong, M.D.	.....	Scarlatina, 15 cases; typhoid, 9 cases.
Fenelon ..	J. W. Ray, M.D .....	.....	None .....
Flamboro', E.....	J. O. McGregor, M.D.	.....	A number of cases scarlet fever; diphtheria, some cases.
Garafraxa, E.....	D. Gear, sanitary inspector.	.....	None .....
Grimsby, S.....	.....	Sanitary inspector visits each house twice each year.	None reported.....
Gower, N .....	F. B. Harkness.....	None .....	None .....
Grey .....	M. Ferguson, M.D ...	Inspection by members of the board in their districts.	None .....

## TOWNSHIPS.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895?	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
Isolation in room of house.	No .....	Some houses disinfected.	Seventeen; all 1 room.	Mr. F. Burrows, of Napanee, P.S.I., is preparing a sanitary report on schools. He says about 500 cubic ft.
The dwelling of such patients are placarded; no hospital.	Not compulsory ....	M.H.O. attends to it in a very satisfactory manner.	Eleven schools; 12 rooms.	.....
.....	No; nearly all the children have been vaccinated.	.....	Eleven schools; 11 rooms.	Cannot say.....
No regular system ..	Some vaccination done in 1894 not very successful.	Burnt sulphur and carbolic acid.	Six schools in township; 1 room in each; average attendance, 24.	.....
No isolation hospital.	Unknown; certainly not compulsory.	Unknown .....	Seven schools.....	.....
No isolation hospital.	Not this year. ....	Burn sulphur and saltpetre; use carbolic acid, white-washing the house.	Four; one room in each.	Don't know .....
None .....	None .....	.....	Nine; 9.....	Don't know .....
Placard dwelling; no hospital.	No .....	Sulphur fumigation; carbolic acid vapor; clothing boiled.	.....	.....
None .....	No; no public vaccination.	None .....	Ten schools; 2 rooms in 3.	.....
.....	.....	Disinfectants used..	.....	.....
.....	.....	.....	Eight .....	.....
Houses placarded...	.....	.....	.....	.....
In cases of necessity the M. H. O. attends to it.	Not compulsory ....	.....	Seven; 1 room in each; 1 with 2 rooms.	.....
.....	Not compulsory; 850 in municipality.	Houses are disinfected under instructions of family physician.	Twelve; No. 1—1 room, atten. 30; 2—1, 25; 3—1, 40; 4—1, 40; 5—1, 35; 6—1, 30; 7—1, 40; 8—1, 30; 9—1, 25; 10—1, 30; 11—1, 37; Union No. 8, 1 room, atten. 35.	Cannot say.....

TOWNSHIPS.—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Erneston .....	Both supplied .....	Two woollen factories, 6 to 8 hands.	Wells; clay and sand; usually clay sub-soil.
Ekfrid .....	Supplied and both make use of them.	Two cheese factories employing 3 hands each.	A great many wells: character of soil varies.
Elderslie .....	Yes.....	Two cheese factories, 1 creamery, employing 3 hands in each.	Soil, gravel, clay and sand: sub-soil, blue clay.
Faraday .....	No; no .....	One saw mill .....	Wells are chiefly used; sandy soil with quick sand.
Fitzroy .....	.....	One woollen factory .....	.....
Ferris .....	No forms.....	None.....	Wells and springs .....
Fredricksburg, N.....	No .....	Three cheese factories; 9 hands.	.....
Fullerton . . . . .	No; no .....	Three cheese factories, employing 4 men; 1 saw mill and factory, 6 men.	Wells; clay, with gravel and sand.
Fenelon .....	No .....	None .....	.....
Flamboro', E.....	.....	.....	.....
Garafraxa, E .....	.....	None .....	.....
Grimsby, S.....	.....	.....	.....
Gower, N .....	None supplied.....	.....	The soil chiefly clay, sandy loam and gravel.
Grey .....	No forms supplied .....	Four cheese factories, 1 employee in each.	Loam and gravel . . . . .

## TOWNSHIPS.—Continued.

No. of dairy cows. Is there medical or veterinary inspec- tion? Give details of any examination of herds for tuber- culosis.	Slaughterhouses. Give number li- censed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by con- tract or only by householder.	Sewage. How dis- posed of, whether by dry earth closets. If so, is there contract re- moval?	State number and kind of noxious trades. How licen- sed and regulated? (See sec. 63 Public Health Act.)
No .....	About 10 in summer; all isolated.	Householder.....		
Don't know .....	None licensed .....	Householder.....		
6,295 cattle in tp.; no cases of tuberculosis reported this year.	None .....			
About 300 cows; no inspection; no ex- amination.	No regular slaughter- houses.	By householder....	No regular system ..	None.
Not known .....	None licensed .....			None.
No dairy cows.....	None .....	Householder.....		None.
Don't know .....	None .....			
.....	None .....			
.....	Two in township....			
.....				
.....	None .....			None.
.....				
No inspection .....	One slaughterhouse; offal goes into Ri- deau river.	By householders....	By householders....	None.
.....	One slaughterhouse; well drained.	By householder ....	Dry earth closets ...	None.



TOWNSHIPS.—*Continued.*

Municipality.	Names of M.H.O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Gwillumbury, W. ....	None .....	.....	No cases reported this year..
Gwillumbury, N. ....	None .....	.....	Diphtheria 3 cases .....
Glanford .....	.....	.....	Sanitary condition of the township was such as not to require the interference of the health officers; typhoid 1 case.
Gwillumbury, E. ....	No M. H. O. Chas. H. Haines, Samuel Vandwater, sanitary inspectors.	Inspector issued notices to inhabitants to clean up premises, etc.	Diphtheria, 8 cases; typhoid, 12 cases.
Goderich .....	.....	.....	No reports of any contagious disease were received, and no complaints made during the year..
Greenock .....	No M. H. O. Lewis Lamb, W. G. Ritchie, sanitary inspectors.	All slaughterhouses, cheese factories, school houses, inspected.	Scarlatina, 4 cases; diphtheria, 3 cases; typhoid, 7 cases.
Grimsby, N .....	J. W. Oliver, M.D....	No inspection .....	Diphtheria, 8 cases, 1 death; typhoid, 2 cases.
Georgina .....	T. C. Nobbs, M.D....	No inspection .....	Diphtheria, 5 cases; typhoid, 4 cases.
Grattan .....	J. T. Dowling, M.D..	None .....	Scarlatina, 6 cases; diphtheria, 9 cases, 1 death; typhoid, none.
Gainsboro'. ....	J. W. Calver, M.D.. The other four members of the board are sanitary inspectors.	When complaints are received, inspection is made.	Scarlatina, 2 cases; typhoid, 8 cases.
Grimsby, S .....	N. P. Henning, M.D.. D. Huntsman, sanitary inspector.	Two general inspections of villages, part of the municipality annually.	Diphtheria, 1; typhoid, 5..

## TOWNSHIPS.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
.....	No vaccination ....	As directed by physician when found necessary.	Fourteen; all single rooms with one exception.	Schools all large ....
In dwelling of patients.	None .....	By order of physician in attendance.	Seven schools .....	.....
.....	.....	.....	.....	.....
No hospital; houses placarded and isolation enforced by Board and M.D.	No; don't know; about 750 school children.	.....	Fifteen schools.....	Sufficient .....
.....	.....	.....	.....	.....
Placard houses and prohibit inmates from mingling with the public.	Not compulsory; don't know.	Carbolic acid and fumigation with sulphur, etc.	Nine; two with 2 rooms; average attendance 55.	About 200... ..
None .....	No .....	Carbolic acid and sulphur; paper removed and walls whitewashed.	Six schools; 7 rooms.	Ample space.....
Patients isolated in all cases.	No; 418; don't know.	Premises disinfected under directions of attending physician.	Six; 8; cannot give attendance.	.....
Houses isolated; no hospital.	No; about 350 school children; none vaccinated in 1895.	House fumigated with sulphur; clothing with chloride solution; privies, cellars and out-buildings with coppermanga water.	Seven; 7 .....	.....
None .....	No .....	Clothing thoroughly aired; house fumigated.	Eleven; 11 .....	.....
Placard; no hospital.	Not compulsory; don't know.	Fumigation as per pamphlet issued by Provincial Board of health.	Seven; one school has 3 rooms; six, 1 room each.	.....

TOWNSHIPS.—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Gwillumbury, W. ....	Don't know .....	None .....	Generally abundant; soil variable.
Gwillumbury, N. ....	.....	None .....	Splendid well water; mostly heavy clay sub-soil.
Glanford .....	.....	.....	.....
Gwillumbury, E. ....	To physicians only ...	Two cheese factories, 3 hands in each; 1 woolen factory, 8 hands; 1 sash and door factory, 6 hands.	Wells; clay; gravel .....
Goderich .....	.....	.....	.....
Grennock .....	Forms supplied .....	Two cheese factories, 4 hands.	Wells and springs; sub-soil varies from gravel to blue clay.
Grimsby, N .....	Yes .....	None .....	Clay soil and sub-soil .....
Georgina .....	No forms supplied ...	.....	Wells; all kinds. ....
Grattan .....	No forms supplied; physicians usually notify Board.	.....	Lakes, springs, running streams and wells; soil principally loam.
Gainsboro'. ....	None; no; no .....	None .....	Wells and cisterns; soil, clay; loam, sub-soil clay.
Grimsby, S .....	Yes; yes .....	One cheese factory, employees 3 hands.	Wells; soil clay, sub-soil rock.

## TOWNSHIPS.—Continued.

No. of dairy cows. Is there medical or veterinary inspection? Give details of any examination of herds of tuber- culosis.	Slaughterhouses. Give number li- censed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by con- tract or only by householder.	Sewage. How dis- posed of, whether by dry earth closets. If so, is there contract re- moval.	State number and kind of noxious trades. How licen- sed and regulated? (See sec. 63 Public Health Act.)
Don't know .....	None .....			None.
No .....	None .....	Householder .....		
About 1,000; no in- spection.	Eight slaughter- houses; no license; offal generally buried.	Householder .....		
Approximately 2,000 cows; no regular system of inspec- tion.	Five slaughter- houses; drained.	By householder ....	Dry earth closets; no contract remov- al.	Five slaughter- houses; licensed and inspected.
No medical or veteri- nary inspection.	None .....	By householder ....	Dry earth closets. ..	None.
Cannot say; some dairy cows have been inspected by veterinary.	None .....			None.
.....	One; not licensed ..	By householder ....	Dry earth closets ..	None.
Don't know; no in- spection.	None .....	By householder ....	None .....	None.
Don't know; No; none .....	None .....	By householder ....		None.



TOWNSHIPS.—*Continued.*

Municipality.	Names of M. H. O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Gosfield, N .....	G. McKenzie, M.D.; James Bennett, sanitary inspector.	No system of general inspection; when cases are reported, inspection follows.	Diphtheria, 6 cases .....
Glanmorgan .....	None appointed .....	.....	Diphtheria, 18, 4 deaths ....
Gloucester .....	— Kennedy, M.D .....	.....	Diphtheria, 51 cases, 16 deaths; scarlet fever, 23 cases, 2 deaths.
Glenelg .....	James Gunn, M.D. ..	Township divided into five districts for inspection purposes.	Scarlatina, 40 cases, 5 deaths; Diphtheria, 4 cases, 1 death; typhoid fever, 5 cases, 1 death.
Gordon .....	.....	None .....	None .....
Garafraxa, W .....	James Dow, M.D.; W. C. Cowan, sanitary inspector.	All school houses, slaughter-houses, yards and closets in Bellwood, inspected.	Scarlatina, number not known; diphtheria, number not known; typhoid, 8 cases.
Hullett .....	Thomas Agnew, M.D. ....	.....	Eleven cases typhoid .....
Hamilton .....	None appointed this year.	No general inspection this year.	None reported .....
Hibbert .....	None appointed .....	The board, in committee, inspected school premises, etc.	Diphtheria, 3 cases, 2 deaths.
Hungerford .....	None .....	.....	.....
Hawkesbury, E .....	No M.H.O.; U. Pilon, sanitary inspector.	No general inspection made.	Diphtheria, 11 cases, 8 deaths
Hagarty, Sherwood, Jones, Richards and Burns.	.....	Sanitary inspector and physicians report all contagious diseases.	Scarlatina, 2 cases .....

## TOWNSHIPS.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
Houses placarded; children prohibited from attending school.	Not this year; about 558 children in municipality; none.	Houses ordered to be whitewashed; new wall paper put on; all clothing washed and fumigated.	Seven; 1 room in each; No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15.	From 235 to 537 cubic feet to each.
Placarding infected houses and closing them.	Don't know of any person being vaccinated during the year.	Under the supervision of the medical attendant.	Six; 1 room in each; cannot give attendance.	Don't know .....
Placarding infected houses and isolation in families under direction of family physician.	No; 895 children; none vaccinated.	Cleaning clothing and fumigating infected houses.	.....	.....
None .....	Not compulsory; about 125 children in municipality.	.....	Four schools; No. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15.	Don't know .....
Patients kept in separate room.	Not compulsory this year; all school children were vaccinated in 1894.	Walls ceilings and floors washed with carbolic acid solution (one in 40); sulphur burned in rooms; bedding, clothing washed, boiled and fumigated.	Eight schools .....	Don't know .....
No .....	No .....	.....	Eleven schools .....	.....
No isolation hospital	Not this year .....	No contagious diseases this year.	Eighteen public schools.	Don't know .....
.....	Not compulsory ....	Not required .....	Ten schools, with 1 room each.	.....
None .....	No; none reported..	None .....	Eighteen; 1 room in each; average about 25.	250 .....
Under instructions of attending physician.	No; 1,658 school children; don't know how many vaccinated.	Carbolic acid used in most cases.	Twenty-five schools; 28 rooms; average attendance about 30 in each.	155 .....
Patients are kept confined to the house.	Number school children in municipality, 675.	All places are thoroughly disinfected by physicians.	Seven schools; 1 room in each.	600 cubic feet .....

TOWNSHIPS.—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply.. Where wells are used give character of soil and sub-soil.
Gosfield, N. ....	No forms supplied ....	One cheese factory, 2 persons employed in each.	Wells; mostly clay soil ....
Glanmorgan. ....	Don't know .....	None .....	Wells; sandy soil .....
Gloucester .....			
Glenelg .....	Physicians supplied ..	None .....	
Gordon .....	None supplied .....	None .....	Wells used; clay loam sub-soil; quick sand.
Garafraxa, W. ....	M.H.O. supplied and makes use of them.	None .....	Wells and springs; clay and sand.
Hullett .....	No .....	Two; butter and cheese ....	Clay, gravel and sand .....
Hamilton .....	No forms supplied....	Three cheese factories; 8 hands in each.	All kinds of soil .....
Hibbert .....	No forms used.....	One cheese factory; 3 hands.	Ordinary wells and springs..
Hungerford .....		Thirteen cheese factories; 8 hands in each.	By wells; water generally good; clay and clay loam and gravel sub-soil.
Hawkesbury, E. ....	Physicians are supplied	Eighteen cheese factories, 2 men in each; 6 carriage shops, 3 in each.	Wells; clay soil, sand and gravel sub-soil.
Hagarty, Sherwood, Jones, Richards and Burns.	Yes; yes .....	No factories .....	Wells and spring .....

## TOWNSHIPS.—Continued.

No. of dairy cows. Is there medical or veterinary inspection? Give details of any examination of herds for tuberculosis.	Slaughterhouses. (Give number licensed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so, is there contract removal?	State number and kind of noxious trades. How licensed and regulated? (See sec. 63 Public Health Act.)
Don't know; no cases of tuberculosis.	Two; drained by ditches; offal fed to hogs.	.....	.....	None except slaughterhouses; no license.
Not known; no inspection.	None .....	By householder ....	Some dry earth closets.	None.
.....	The Board experienced some difficulty with pigs and slaughterhouses.	.....	.....	.....
.....	.....	.....	.....	.....
About 250 cows; no inspection.	None .....	Householder.....	Dry earth closets; no contract removal.	None.
No dairy cows; no inspection made.	One; not licensed; offal is burned and drained into Grand River.	Garbage and night soil burned and buried by householder.	Dry earth closets; contract removal in some cases.	None.
No .....	One.....	.....	.....	Not any.
Don't know; no inspection.	Three; licensed; offal buried.	By householder ....	Dry earth closets ...	None.
No disease amongst the cattle this year.	No slaughterhouses.	Garbage and night soil disposed of by means of closets, by householder.	Closets .....	None.
About 5,400 cows; no; none.	2 slaughterhouses; not licensed; offal buried or burned.	Disposed by householder.	Dry earth closets ...	None.
About 5,000; no medical or veterinary inspection.	5 slaughterhouses; none licensed; some bury offal, others boil it and feed to pigs.	Each farmer has his own way of disposing of it.	.....	None.
About 1,200 milch cows in municipality; no inspection.	None .....	Put on land that is cultivated by householder.	Dry earth closets ...	None.



TOWNSHIPS.—*Continued.*

Municipality.	Names of M. H. O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Hay .....	— Buchanan, M.D....	School houses and public places inspected once a year.	No cases reported .....
Harvey .....	C. E. Bonnell, M.D. ....		Two families had diphtheria.
Howard .....	A. J. Stevenson, M.D.; F. Arnold, sanitary inspector.		Scarlatina, 2 cases; typhoid, 6 cases.
Hillier .....	J. B. Ruttan, M.D. ....	No inspection . . . . .	Diphtheria, 2 cases, mild type.
Howick .....	A. M. Spence, M.D....	The board inspects as a body.	Scarlatina, 3 cases; diphtheria 3 cases.
Harwich .....	J. McCully, M.D.....	On complaint, the sanitary inspector sent, and reports in writing.	Scarlatina, 2; diphtheria, 1; typhoid 1.
Hope .....	A. C. Beatty, M.D.; John McIlroy, sanitary inspector.	Personal inspection by sanitary inspector.	Scarlatina, 2 cases, 1 death; typhoid, 1 case, 1 death.
Houghton .....	— Johnston, M.D. ....		Typhoid in one family, 1 death.
Huntington .....	E. Harrison, M.D.; H. Wood.	Inspection done by sanitary inspector.	
Humberstone .....	F. M. Haney, M.D.; E. Augustine, sanitary inspector.	Inspector visits places to which his attention has been called.	Diphtheria, 2 cases; typhoid, 1 case.
Howe Island .....	— Ryan, M.D. ....		Township free from all contagious diseases in 1895.
Hinchinbrook .....	A. Lockhart, M.D....	None .....	None .....
Joceyn .....			None .....
Joly .....	— Carmichael, M.D.	Each member of the Board inspects that portion of his township in which he resides.	None .....
Kaladar .....	None appointed .....		None .....
Kinloss .....	J. S. Tennant, M.D.; no sanitary inspector.	Inspection is made by each member of the Board.	Diphtheria, 7 cases, 1 death; typhoid, 3 cases.

## TOWNSHIPS.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
			Fifteen schools; 19 rooms.	
	None	Physicians in charge disinfect houses.	Sixteen schools	
Placarding houses	No	M. H. O. attends to this matter.		
M. H. O. placards the premises.	No; no; about 1,400	M. H. O. disinfects.	Eighteen schools; 20 rooms; 74.	
Dwellings placarded.	Not compulsory	Carbolic acid used freely; soiled clothing burned. Walls whitewashed; sulphur burned.	Twenty-one schools.	Don't know
Placarding and isolation of inmates.	Not compulsory; 1,375 children in municipality.	Under direction of M. H. O.	Eighteen 1 in each school.	
	430 persons vaccinated.			
	No	Disinfection with sulphur fumes, etc.	Twelve	
No hospital, patients are isolated in their rooms.	No vaccination this year.	Hot turpentine spray by inhaler and burning of sulphur, etc.	Nine schools; $\frac{1}{16}$ , $\frac{1}{17}$ , $\frac{3}{16}$ , $\frac{2}{11}$ , $\frac{3}{13}$ , $\frac{3}{16}$ , $\frac{1}{16}$ , $\frac{1}{16}$ .	About 300 cubic feet.
	About 60; none in 1895; all vaccinated in 1894.		Four; 4 rooms.	
	Don't know	None		Don't know
	No		Four	
None	No; 60; none		Two; 2	Don't know
None	None	No contagious diseases of any kind.	Nine; one room in each, with one exception.	Don't know
By placarding the premises.	Cannot say how many	Looked after by M. H. O.	Ten schools; attendance, 56 in each.	

TOWNSHIPS.—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Hay .....			
Harvey .....			
Howard .....			
Hillier .....	M. H. O. uses them ..	One evaporator, 10 hands ..	Clay, limestone, gravel and rock.
Howick .....		Three cheese factories, 3 employees in each.	Springs; clay loam and gravel
Harwich .....	None .....	Four saw-mills .....	Wells; gravel soil .....
Hope .....	No forms .....	Two cheese factories, 2 hands in each.	Soil varies from heavy clay to gravel.
Houghton .....			
Huntington .....	None supplied.....	Five cheese factories, 3 employees in each.	Chiefly limestone formation.
Humberstone .....	None supplied.....	Eleven cheese factories, 2 hands in each; silver plating factory, 60 hands; 2 cabinet shops, 4 hands in each; 1 foundry, 5 hands; 2 carriage shops, 9 hands; 2 harness shops, 3 hands; 1 glass factory, 15 hands.	Wells chiefly sandy loam; sub-soil clay and rock.
Howe Island .....	No forms used.....		River St. Lawrence .....
Hinchinbrook .....	Don't use any .....	None but cheese factories....	Gravel and sandy loam.....
Joceyn .....		None .....	Springs .....
Joly .....	Not supplied .....	None .....	Sandy loam; sub-soil hard pan.
Kaladar .....	Not aware of any .....	Three cheese factories .....	All wells and springs; sandy soil, principally gravel sub-soil.
Kinloss .....	Don't know .....	Two cheese factories and one creamery; 2 hands in.	Wells and running springs ..

## TOWNSHIPS.—Continued.

No. of dairy cows. Is there medical or veterinary inspec- tion? Give details of any examina- tion of herds for tuberculosis.	Slaughterhouses. Give number li- censed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by con- tract or only by householder.	Sewage. How dis- posed of, whether by dry earth closets. If so, is there contract re- moval?	State number and kind of noxious trades. How licen- sed and regulated? (See sec. 63 Public Health Act.
None .....	Three; satisfactorily attended to.	Householder .....	One fish phosphate allowed by council.	
Don't know; no.	Two .....	Householder .....	None licensed.	
No inspection .....	4 slaughterhouses; offal fed to hogs.	Householder .....	No dry earth closets.	None licensed.
Cannot furnish the number; no inspec- tion.	About 16 in P't Hope & Hope Township; none licensed.	Householder .....	Dry earth closets principally.	None.
.....	3 slaughterhouses; not licensed.	Householder .....		
.....	Four open drains; offal disinfected; drains also disin- fected.	Householder .....	Dry earth closets; no.	None.
About 400 .....	None .....	Householders .....	Dry earth .....	None .....
Don't know .....	None .....			
.....	None .....			
297 cattle in town- ship; no inspec- tion.	None ..	Householder .....	Not contract .....	None .....
About 800 cows; no; none.	One; none .....	In the ordinary way.		None.
Ten cows, exclusive of farmers' stock; no examination.	One; no science; cannot say.	By householder ....	Put on land .....	None.



TOWNSHIPS.—*Continued.*

Municipality.	Names of M. H. O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Keppel .....	.....	.....	Three deaths from contagious diseases; 38 deaths occurred in township for the year from all causes in a population of 3,874.
Kennebec .....	John R. Helm, M.D. ....	.....	None .....
Kincardine .....	Thomas Bradley, M.D.; R. Mackenzie, sanitary inspector.	.....	Typhoid, 11 cases, 3 deaths..
Kingston .....	None .....	.....	.....
Laxton, Digby and Langford.	B. Coleconk, M.D. ....	.....	Diphtheria, 2 cases, 1 death.
Lindsay and St. Edmunds.	J. H. Harnwell, M.D.; R. Irwin, sanitary inspector.	No general inspection .....	None .....
Lochiel .....	A. L. McDonald, M.D.; J. J. McMillan, sanitary inspector.	.....	Scarlatina, 18 cases, 7 deaths; diphtheria, 5, 1 death.
Lavant .....	—Kelborn, M.D. ....	No inspection .....	None .....
Lanark .....	None appointed .....	No inspection; each member of the Board attends to matters in his own district.	None .....
Logan .....	A. D. Smith, M.D. ....	.....	Smallpox, 3 cases; diphtheria, 2 cases, 1 death; typhoid, a few mild cases.
London .....	G. McNeil, M.D. ....	.....	Typhoid was prevalent in September and October; only two deaths from this cause were reported; 3 cases of scarlatina were reported.
Laird .....	.....	None needed .....	None .....
Luther, West .....	A. E. Clendennan, M.D.; Jonathan Tovell, sanitary inspector.	.....	Diphtheria, 10 cases, 1 death; typhoid, 3 cases, 1 death.
Lobo .....	P. S. Graham, M.D. ....	.....	Scarlatina, 20 cases, 1 death; typhoid, 20 cases, 1 death.

TOWNSHIPS.—*Continued.*

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
Placarding houses.....	No compulsory vaccination this year; last year about 900 persons were vaccinated.			
.....	No .....		Eleven; average 25 attendance.	
.....	No; none vaccinated		Eighteen schools....	
.....	None vaccinated....			
Isolated in their dwelling.	No .....		Six; one room in each.	
This township is new and thinly inhabited; no need for isolation hospital.	None .....		Five .....	Don't know .....
Seven houses isolated in township.	No .....	Burned sulphur; washing walls with carbolic solution, etc.	Eighteen; eighteen.	165 cubic-feet .....
.....	No; 187 school children.		Five schools; one room in each.	
No contagious diseases and no isolation.	Not compulsory ....	None .....	Ten schools; one has two rooms, all the others only one.	Cannot say .....
The cases of smallpox were isolated in farmhouses; a special physician and two trained nurses employed.	Yes; under instructions of the Secretary of the Provincial Board of Health.			
.....				
No .....	No; 69; don't know.	None .....	Two; 1 room in each.	Cannot say .....
No isolation hospital.	No .....	Under the direction of physicians.	Eight .....	
.....	Yes .....	All discharges from the body were disinfected; rooms cleaned and fumigated.	Ten; average attendance from 40 to 50.	

TOWNSHIPS.—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Keppel .....			
Kennebec .....		One cheese factory ; 2 hands.	Wells ; gravel sub-soil .....
Kincardine .. .....	No forms .....	Five cheese factories ; 2 employees in each.	Clay soil .....
Kingston .....			
Laxton, Digby and Langford.	No .....	None .....	Wells .....
Lindsay and St. Edmonds.	Don't know of any....	None .....	Mostly springs flowing from lime rock.
Lochiel .....	Yes ; yes .....	Fourteen cheese factories ; 2 in each.	Wells and springs ; clay and limestone.
Lavant .....	None supplied.....	None .....	Mostly spring water ... ..
Lanark .....	None used.....	None .....	Mostly wells and springs ...
Logan .....			
London .....			
Laird .....		None .....	Gravel and clay loam .....
Luther, West .....	No .....	One cheese factory ; 3 hands.	
Lobo .....			

## TOWNSHIPS.—Continued.

No. of dairy cows. Is there medical or veterinary inspection? Give details of any examination of herds for tuberculosis.	Slaughterhouses. Give number licensed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so, is there contract removal?	State number and kind of noxious trades. How licensed and regulated? (See sec. 63 Public Health Act.)
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
About 300.....	None .....	.....	.....	.....
Cannot say how many	Three; offal is burnt.	By householder ....	.....	None.
No inspection .....	.....	.....	.....	.....
.....	None.....	Householder . . . .	Dry earth .....	None.
Cannot give number of cows; no inspection.	None.....	No towns or villages in this municipality.	.....	.....
No medical or veterinary inspection.	None in township...	.....	.....	.....
.....	None.....	Householder.....	.....	.....
Don't know; no; no.	None.....	None.....	No sewage.....	None.
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
.....	.....	.....	The subject of night-soil affecting the health of the people has been.	.....
97; no; none.....	None.....	.....	.....	.....
No inspection .....	.....	.....	.....	.....
.....	.....	.....	.....	.....



TOWNSHIPS.—*Continued.*

Municipality.	Names of M.H.O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Luther, East. ....	A. C. Gavellier, M.D.; P. McLellan, sanitary inspector.	General inspection in May ..	Typhoid, 80 cases, 3 deaths..
Malahide.....	C. Sinclair, M.D.; A. Miller, sanitary inspector.	No general inspection; acts under instructions in special cases.	Smallpox, 10 cases; 3 deaths in 1894.
Madoc.....	E. D. Harrison, M.D.	No general inspection.....	None .....
Mattawan .....	None .....	.....	None .....
Medora and Wood....	No M.H.O.; J. P. May, sanitary inspector.	Really no inspection.....	None .....
Monteagle and Herchel.	Robertson, M.D.; no sanitary inspector.	None .....	None .....
Marmora Lake .....	H. M. Jones, M.D....	Inspection only when complaints are made.	Scarlatina, 2; diphtheria, 1.
Mayo .....	None .....	.....	Diphtheria, 6 cases, 2 deaths.
Moulton .....	N. Hopkins, M.D.; a resident inspector in each ward.	.....	Scarlatina, 4 cases; diphtheria, 1 case, 1 death.
Mulumur.....	A. G. Island, M.D....	.....	Scarlatina, 2 cases; diphtheria, 2 cases, 2 deaths; typhoid, 12 cases, 1 death.
Mara .....	Wm. Gilpin, M.D....	.....	Scarlatina, 47 cases, 10 deaths; diphtheria, 20 cases, 3 deaths.
Morrison .....	Shaw, M.D .....	.....	Diphtheria, 2 or 3 cases, no deaths.
Medoute ... ..	Drs. Hawley & Heaslip; Messrs. Martin and Moffit, sanitary inspectors.	M.Ds. and inspectors look after their own districts.	Diphtheria, 1 case .....

## TOWNSHIPS.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895?	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
Isolation of contagious carefully carried out.	No .....	Clothing boiled, sulphur fumigation, etc.	Eight .....	
Isolated and quarantined in smallpox cases.	Yes .....	Infected houses disinfected under direction of M.H.O.	.....	
Confined to private residence; no isolation hospital.	No; cannot tell now.	Carbolic acid and bichloride of mercury.	Sixteen generally; 1 room.	
None .....	No; 100; don't know.	Ordinary means adopted by attending physician.	One; 1 room; average, 25.	About 200 .....
.....	A few; number not known.	.....	Twelve schools; 1 room in each; from 15 to 40 in each.	
.....	No .....	.....	Nine schools; 1 room each.	Cannot say .....
Houses kept isolated; no one allowed in or out; walls sprayed every other day, etc.	No; none in 1895...	Nurse and patient disinfected every day; walls sprayed with a solution, floors with carbolic acid wash; doors covered with cheesecloth and sprinkled with solution of mercury; sulphur burnt in rooms.	One school; 3 rooms; 30, 49, 43.	180 cubic feet .....
Schools closed and private residence isolated far as possible.	No .....	At home by order of attending physician.	Three; 1 for each...	
No .....	415; none .....	.....	Eight schools; 8 rooms.	
No hospital; no .....	No .....	.....	.....	
Each family was quarantined.	None vaccinated; 500 school children in township.	Disinfecting was done under direction of M.H.O.	Eleven; 1 room in each; average attendance, 50.	
Houses placarded .....	.....	Houses fumigated ..	Five; 1 room in each.	
No hospital; houses placarded and disinfected.	No; 1,059 school children in township.	No diseases of an infectious nature.	Eight schools .....	

## TOWNSHIPS.—Continued.

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Luther, East .....	None .....	None .....	Wells .....
Malahide .....	.....	.....	.....
Madoc .....	Neither are supplied..	Seven cheese factories .....	Wells and streams .....
Mattawan .....	Not supplied .....	None .....	Sandy soil .....
Medora and Wood....	No .....	No factories, but summer hotels and school houses.	Lake water in a few cases; wells and springs.
Monteagle and Herschel.	No .....	Four cheese factories .....	Good .....
Marmora Lake .....	None supplied .....	Woollen factory; 6 hands...	Wells; heavy loam; sub-soil clay and loam.
Mayo .....	None supplied .....	None .....	Mostly running streams....
Moulton .....	No .....	None .....	Wells; all kinds of soil .....
Mulmur .....	.....	.....	.....
Mara .....	No .....	None .....	All kinds of soil .....
Morrison .....	.....	None .....	Wells used .....
Medonte .....	Don't know .....	None .....	Springs and wells; soil generally clay, with gravel sub-soil.

## TOWNSHIPS.—Continued.

No. of dairy cows. Is there medical or veterinary inspection? Give details of any examination of herds for tuberculosis.	Slaughterhouses. Give number licensed. How drained and how disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so, is there contract removal.	State number and kind of noxious trades. How licensed and regulated? (See sec. 63 Public Health Act.)
None.....	Two; none licensed.	Householder.....	Mostly privy pits.....	
None .....				
Don't know .....	None .....	Householder.....	Dry earth closets ...	None.
None .....	None .....	By householder ...	No contract; no dry earth closets.	None.
.....	Two; no license; offal buried.	Buried .....		
Cannot say .....	None .....		No sewage .....	None.
Cannot say number of cows; no dairy; no inspection.	No licensed slaughterhouses; no drainage; offal disposed of in a careless way.	Garbage by householder; night soil removed about every 6 months.	No sewerage system.	None.
.....	None .....	Householder.....		
Not given .....	None licensed .....			
.....				
None .....	One; not licensed ..	Householder.....	None .....	None.
.....	None .....			
About 2,000; no inspection.	Eight; none licensed.	Householder.....	Dry earth closets; no contract removal.	



TOWNSHIPS.—*Continued.*

Municipality.	Name of M. H. O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Melancthon .....	James H. Reid, M.D.; Wm. August, sanitary inspector.	Very thorough in extent ....	Scarlatina, 3 cases, 1 death..
Murray .. . . .	P. J. Clune, M.D.; M. W. Rutton.	Inspection made when complaint is received.	Typhoid, 12 cases, 2 deaths..
Malden .....	T. J. Park, M.D. ....	Physicians report all contagious diseases and placard the houses.	Typhoid, 3 cases; 3 deaths..
Middleton.....	J. W. Renwick, M.D.	Each member of the board inspects a portion of the township.	Diphtheria, 4 cases; 3 deaths
Monmouth .....	W. Giles, M.D.; A. W. Spears, sanitary inspector.	No inspection except ordered by the board.	Diphtheria, 1 case .....
Minto.....	W. A. Harvey, M.D.	.....	Scarlet fever, 2 cases .....
Mariposa .....	James Blewitt, M.D..	House to house inspection in villages, school houses and cheese factories by the inspector.	Scarlatina, 9 cases; 1 death; diphtheria, 1 case; typhoid, 4 cases; 3 deaths.
Matchedash .....	Oliver Bower, sanitary inspector.	.....	None .....
Maryborough .....	Jas. J. Cassidy, M.D..	.....	Several cases of typhoid fever existed during the year owing to the low condition of water supply; 1 death; diphtheria, 2 cases.
Maidstone.....	R. F. Rorke, M.D....	.....	Scarlatina, a few cases; diphtheria, a few cases; typhoid, 2 cases.
Minden .....	— Curry, M.D. ....	Inspection when complaint is made.	Scarlatina, 30 cases; 1 death; diphtheria, 14.
Metcalf .....	A. Nixon, M.D.; W. Henry, sanitary inspector.	Inspected personally.....	Typhoid, 3 cases.....
Mersea .....	C. Cumberland, M.D..	.....	Diphtheria, 2 cases; 2 deaths; typhoid, 15 cases; 3 deaths

## TOWNSHIPS.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details of how carried out.	Number of schools: Number of rooms and attendance in each.	Average cubic air space to each pupil.
.....	No .....	By isolation as far as practicable.	Thirteen schools; No. 1, 20; 2, 34; 3, 27; 4, 25; 5, 25; 6, 16; 7, 25; 8, 30; 9, 35; 10, 20; 11, 16; 12, 20; 13, 25.	No. 1, 897; 2, 150; 3, 240; 4, 352; 5, 570; 6, 567; 7, 173; 8, 672; 9, 350; 10, 684; 11, 625; 12, 416; 13, 395.
Isolation as thorough as possible in houses; no hospital.	No; none .....	This is carried out by physician.	Fourteen .....	.....
No contagious diseases.	No; none .....	.....	Six .....	.....
None .....	No; none .....	.....	Thirteen .....	.....
None .....	None .....	.....	Five .....	.....
No hospital .....	No .....	None .....	Thirteen .....	600 .....
None .....	No .....	Patients confined to rooms, and usual disinfectants.	Twenty-three; three have 2 rooms.	.....
None required this year.	No vaccinations reported to local board.	Sulphur fumes and carbolic acid used.	Two; 1 room in each .....	.....
.....	Vaccination seems to be neglected.	.....	.....	.....
Houses placarded ..	No; 933 in municipality; don't know how many were vaccinated.	Don't know; physicians generally attend to this.	Twelve; 13 .....	.....
No hospital; patients isolated at their homes.	No; about 300; none	Thorough cleaning; excreta burned, clothing burnt or boiled; houses fumigated.	Nine; 1 with 2 rooms	250 .....
None .....	No .....	Don't know .....	Eight; 8 .....	.....
No isolation hospital; patients are isolated at their homes.	.....	.....	Fourteen .....	.....

TOWNSHIPS.—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Melancthon .....		One sash and door factory, employing 5 hands; 1 woollen mill, 5 hands; 1 cheese factory, 7 hands.	Clay loam; sub-soil varies ..
Murray .....	Yes; no.....	One fruit evaporator, 14 hands; 4 cheese factories, 3 hands.	Wells and springs .....
Malden .....	Physicians supplied ..	None .....	Drilled wells .....
Middleton.....	None supplied.....	Two cheese factories; 2 hands in each.	
Monmouth .....			
Minto.....	No; forms are supplied to physicians.	Two cheese factories; 3 hands in each.	
Mariposa .....		Three cheese factories .....	Wells generally; loam and clay sub-soil.
Matchedash .....	No need of them.....	None .....	Wells; soil, clay loam and sand.
Maryborough .....			
Maidstone.....	Teachers usually give verbal notice.	None .....	Wells generally .....
Minden .....	No .....	None .....	Wells: soil, sandy loam ....
Metcalf .....	None .....	Two cheese factories.....	Springs and rock wells.....
Mersea .....	Yes .....		Wells; soil sandy; sub-soil clay.

TOWNSHIPS.—*Continued.*

No. of dairy cows. Is there medical or veterinary inspection? Give details of any examination of herds for tuberculosis.	Slaughterhouses. Give number licensed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so, is there contract removal?	State number and kind of noxious trades. How licensed and regulated? (See sec. 62 Public Health Act.)
1,900; no veterinary inspection.	No licensed; all are isolated; offal is removed at once to fertilize the soil.	Garbage is removed.	Sewage removed....	None.
No inspection .....	Four; 3 licensed....	Householder.....		
.....				None.
.....	None .....	Householder.....		None.
.....				
About 1,500; supply milk to factories; no.	Five; mostly fed to hogs.	.....		None.
No .....	None .....	Householder.....	Mostly privy pits...	None.
.....				
No report of any disease among the cattle.	.....	Used on land with other manure.	.....	None.
.....	None in township .....	.....		
.....	Can't say how offal is disposed of.	.....		
The milk of 150 cows sent to cheese factories.	None .....	Householder.....	No drainage; a few dry earth closets.	None.
Cannot say .....	None .....	Householder.....	Don't know .....	None.
.....		Householder.....		



TOWNSHIPS.—*Continued.*

Municipality.	Names of M. H. O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Mornington .....	James Johnston, M.D.	.....	Typhoid, 7 cases.....
Machar .....	None .....	None .....	Diphtheria, 3 cases ; 1 death.
Macaulay .....	Sam'l Bridgland, M.D.	.....	Diphtheria, 1 case.....
McLean and Ridout ..	None ; T. W. Warren, sanitary inspector.	.....	Diphtheria, 6 cases ; 3 deaths ; Typhoid, 1 case ; no death.
McKim ....	R. B. Struthers, M.D.	Visits made when necessary.	Scarlatina, 75 cases ; 3 deaths ; diphtheria, 9 cases ; 3 deaths ; typhoid, 8 cases.
McKillop .....	No M. H. O.....	.....	No contagious diseases except whooping cough.....
McMurrich .....	H. L. Barber, M.D. ; Wm. Pearce, sanitary inspector.	Village of Sprucedale and neighborhood visited by inspector.	Diphtheria, 7 cases ; typhoid, 2 cases.
McNab .....	— Cranston, M.D.	.....	A few cases scarlatina, a few cases diphtheria ; 1 death.
Missouri, West .....	P. Ford, M.D. ; W. Faircloth, sanitary inspector.	A personal inspection under direction of chairman.	Typhoid ; 2 cases .....
Nichol .....	H. H. Paget, M.D .....	.....	A few cases of typhoid and diphtheria ; physicians fail to report all contagious diseases.
Normandy .....	P. McLean, M.D. ; M. O'Donnell, sanitary inspector.	Sanitary inspector inspects twice a year.	Diphtheria, 5 cases ; all recovered.

## TOWNSHIPS.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
Physicians do the best they can. No isolation hospital.	Not this year, but two years ago vaccination was general; 977 in tp.	Been carried out by physician.	Fifteen; 15 .....	Don't know .....
.....	None .....	Disinfected by carbolic acid and chloride of lime, under the supervision of a member of board.	Six; 7 .....	.....
No person allowed to leave the premises to mingle with the public.	No; don't know.....	.....	Nine; 9.....	.....
According to directions in pamphlets issued by Provincial Board.	No .....	.....	Four; 4.....	No. 1, 128; 2, 194; 3, 184; 4, 364 ft ..
No hospital; isolation enforced by tp. authorities.	Not compulsory ....	Sulphur fumes; houses fumigated.	Two; 2; attendance 30 to 45.	2, 152; 3, 225 .....
.....	Quite a number of children were vaccinated.	.....	.....	.....
No hospital, but non-intercourse strictly carried out.	No vaccination in 1895; about 150 in municipality.	Disinfection under direction of M. H. O., by sulphur, carbolic acid, etc.	Six; 6 .....	300 .....
.....	No; 1,264 school children.	.....	Fourteen; 16 .....	Don't know .....
.....	Not this year; was well attended to in 1894.	Excreta of typhoid disinfected and buried.	Eleven; one has 2 rooms.	Cannot say .....
.....	.....	.....	.....	.....
Houses placarded; no hospital.	No; children from 5 to 16, 1,027; 650 vaccinated in 1894.	By burning sulphur, using chloride of lime, and carbolic acid.	Seventeen schools; 20 rooms.	Don't know .....

## TOWNSHIPS.—Continued.

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Mornington .....	Physicians supplied ..	Two cheese factories, 6 hands; 1 tile and brick factory, 20 hands; 2 saw mills, 10 hands; 1 flax mill, 10 hands; 1 chopping mill, 2 hands.	Wells .....
Machar .....	Supplied as required..	Saw mills; 60 to 80 hands...	Wells .....
Macaulay .....	.....	.....	Wells; good water.....
McLean and Ridout ..	None supplied.....	.....	Wells; sandy loam and hardpan.
McKim .....	None supplied .....	None .....	Clay and quicksand .....
McKillop .....	.....	.....	.....
McMurrich .....	No .....	None .....	Wells; sandy and gravelly..
McNab .....	No .....	Two cheese factories .....	Creeks, springs and wells....
Nissouri, West .....	No; no .....	Four cheese factories, 4 in each; 1 box factory, 6 hands.	Well supply; clay, and clay loam sub-soil.
Nichol .....	.....	.....	.....
Normandy .....	All supplied; yes ....	Three cheese and 2 butter factories, 3 men in each; 1 woollen factory, 7 employees; 1 flax mill, 8 employees; 2 grist mills, 2 employees each; 6 saw mills, employing about 20 hands; 2 planing and sash factories, 6 hands; 1 foundry, 4 hands; 1 tannery, 4 hands.	Clear springs, wells, and artesian wells; clay and gravel, on granite rock.

TOWNSHIPS.—*Continued.*

No. of dairy cows. Is there medical or veterinary inspection? Give details of any examination of herds for tuberculosis.	Slaughterhouses. Give number licensed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so, is there contract removal?	State number and kind of noxious trades. How licensed and regulated? (See sec. 63, Public Health Act.)
Don't know number; only when required; 1 case of tuberculosis.	Two non-licensed; offal burnt; blood given to pigs.	.....	Generally by drainage.	.....
.....	One slaughterhouse; offal used as manure.	Householder.....	Privy pits; a few dry earth closets.	.....
.....	.....	.....	.....	.....
No inspection or examination.	Two; both licensed; offal fed to hogs.	Householder.....	.....	Four storage houses for green hides.
47; no examination.	None .....	Householder.....	Dry earth closets ..	None.
.....	.....	.....	.....	.....
None in regular dairy business; no examination; no inspection.	.....	Householder.....	Ordinary privies....	.....
.....	.....	.....	.....	.....
About 2,000; none..	Four; offal consumed by hogs.	By householder ....	Dry earth closets ...	None.
.....	.....	.....	Two complaints made about the unsanitary condition of water closets.	.....
Over 2,000; no inspection.	Three; licensed; offal used as fertilizer on land.	By householder ....	No sewerage system.	None.



## TOWNSHIPS—Continued.

Municipality.	Names of M.H.O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Nassagawaye .....			Scarcely any contagious diseases in this township; only a few cases of scarlet fever.
Nepean, .....	G.O. Richardson, M.D.; R. Hill, sanitary inspector.	The sanitary inspector's report says he inspected 210 back yards and closets; ordered 18 to be cleaned up.	Diphtheria, 10; scarlet fever 14; typhoid, 3.
Norwich, North .....	W. R. Watson, M.D.	Sanitary inspector makes general inspection in the month of June.	Scarlatina, 3 cases; typhoid, 2 cases.
Nottawasaga .....	D. McAllister, M.D.; Coln McDougall, sanitary inspector.	Inspector reports township in good condition.	None .....
Nissouri, East .....	R. E. Fowler, M.D.; H. G. Gourley, sanitary inspector.		Scarlatina, 10 cases; typhoid, 2 cases.
Nipissing .....	J. A. Porter, M.D.; F. Sloman, sanitary inspector .....	House to house inspection .....	None .....
Osnabruck .....	— Jamieson, M.D.; A. Wesley, sanitary inspector.	Premises inspected .....	
Oxford .....	Jones, M.D. ....		
Ops .....	T. W. Pool, M.D.; W. F. O'Boyle, sanitary inspector.	Every physician attending patients, reports to M.H.O. when any contagious disease is met with.	Scarlatina, 1; diphtheria, 4; typhoid, 4.
Orford .....	P. N. Davis, M.D. ....	Only very few complaints and of minor importance.	Typhoid, 1 case .....
Oso .....	H. N. Coulter, M.D.; Kilborn, M.D.		Typhoid, 10 cases. ....
Oro .....	W. H. Clutton, M.D.; R. W. Metcalf.		Scarlatina, 20 cases, 1 death; diphtheria, 2 cases.
Oxford, E. ....	J. McClurg, M.D. ....		Diphtheria, 1 case; typhoid, 5 cases.

## TOWNSHIPS—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
All patients isolated.	No; no	Under the supervision of M.H.O.	9, 10	
	Not compulsory		24	
The dwellings all isolated.	No; don't know		11	
		Using chloride of lime, etc.	3; attendance, 38, 22, 25.	
No hospital.	No; none.		Twenty-three; 23 rooms.	
None	No.	None	Sixteen; 18; average, 20.	
Patients are generally confined in a room by themselves and attended by the nurse and physician only.	Not compulsory.	Chiefly fumigation with sulphur.	Eleven; all brick buildings; average attendance, 34.	400 cubic feet.
Had no occasion.	No, but generally carried out; about 50 vaccinated.	None of note.	Ten sections; one 2 rooms, one 3 rooms, balance have 1.	
No isolation hospital	No; no record.	Disinfection carried on under direction of attending physician.	Nine; 1 room in each.	Lots of space.
	No		Sixteen	
No isolation hospital; children kept from school.	All children were vaccinated 1894.	Carried out by physician in charge.	Six; No. 3, 25; No. 4, 30; No. 5, 24; No. 6, 32; No. 7, 46; No. 8, 25.	

TOWNSHIPS—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Nasagawaye .....	.....	.....	.....
Nepean .....	.....	.....	.....
Norwich, North .....	None .....	Five cheese factories, 3 hands employed in each.	Wells; clay loam .....
Nottawasaga .....	Supplied M.H.O.....	Don't know .....	Wells used; sub-soil gravel and rock.
Nissouri, East .....	No ... ..	Six cheese factories, 3 hands each.	Springs and good wells; generally hard clay, and in some cases gravel and sand.
Nipissing .....	No .....	None .....	Wells .....
Osnabruk.....	No.....	None.....	Wells; good water.....
Oxford .....	No; no.....	Nine cheese factories; 20 employees.	Sandy loam.....
Ops .....	Forms used.....	No factories except one large brick saw mill and cheese factories; employees, 20.	The water supply is good.
Oxford.....	.....	None.....	Usually good.....
Oso .....	Don't know .....	Four cheese factories.....	Spring wells; good water...
Oro .....	Not supplied.....	.....	Wells; sand, gravel and clay.
Oxford E.....	None. ....	Three cheese factories. ....	Wells.....

## TOWNSHIPS—Continued.

No. of dairy cows. Is there medical or veterinary inspection? Give details of a ny examination of herds for tuberculosis.	Slaughterhouses. Give number licensed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so is there contract removal?	State number and kind of noxious trades. How licensed and regulated? (See sec. 23 Public Health Act.)
	Slaughter houses inspected 6 times during the year.			
Cannot give number.	3; none licensed....	Householder.....	None .....	
None .....	One licensed.....	No garbage or night soil allowed to accumulate.		
	None in municipality.			
None .....	None .....	Householder .....	Dry earth closets ...	
5,129; no; none....	One or two; none licensed, but are inspected.	Householders.....	Dry earth closets ...	None.
	None.....	Householder.....		None.
No dairy proper; every farmer keeps a few cows; no cases of tuberculosis this year as any having symptoms were ordered to be slaughtered by veterinary surgeon.	Four; all licensed; fed to hogs.	Dry earth being used.		None.
None .....		Householder.....		None.
About 600; no inspection.		Householder.....		
		Householders.....		
None except those belonging to farmers.	Three; none licensed; offal fed to pigs.	Closets used .....	On the farms .....	None.

TOWNSHIPS.—*Continued*

Municipality.	Names of M.H.O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Oxford, N.....	L. McWilliams, M.D.; J. H. Wickins, sanitary inspector.		Scarlatina, very few cases; diphtheria, very few cases; typhoid, none.
Oxford, W .....		Premises in good sanitary condition.	No typhoid or other contagious cases in township this year.
Papineau .....	None .....	Limited to the inspection of members of Board.	Typhoid, 1 case.....
Perry .....	H. L. Barber, M. D.; Chas. McPhail, sanitary inspector.		Diphtheria, 2 cases .....
Pelham .....			Diphtheria, 1 case; scarlet fever, 1 case.
Plympton .....	P. McG. Brown, M.D.		
Puslinch .....	A. Munroe, sanitary inspector.	General inspection spring and fall; immediate attention given to complaints.	Typhoid, 6 cases.....
Pickering .....	No M.H.O.; 3 sanitary inspectors.	General inspection made by sanitary inspectors.	Scarlatina, 2 cases; diphtheria, 8 cases, 2 deaths; typhoid, 6 cases, 1 death.
Palmerston.....	John Elkington, M.D.	Township is divided into four districts and each member inspects his portion.	Scarlatina, 4 cases .....
Pembroke .....			Several cases of typhoid in adjacent township; the number of deaths from all causes in township was 6.
Proton .....	R. A. Mitchell, M.D.	Five divisions; one member attends to each.	Several cases of diphtheria, scarlatina and typhoid.
Pelee .....	None .....		None .....
Percy .....	J. M. Clemenson, M.D.; A. M. Sanborn, sanitary inspector.	Thorough inspection by members of Board.	Scarlatina, 7 cases; diphtheria, 5 cases, 1 death; typhoid, 2 cases.



## TOWNSHIPS.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
None; no.....	No.....	None.....	Three.....	.....
No hospital, but township has given a grant towards isolation hospital of Mattawa town and patients may be sent there.	No; 170 between the ages of 5 and 16; don't know, but very few, if any.	Ordinary methods of a physician.	Three; 3; average, 26.	About 200 cubic feet.
Dwelling placarded.	Yes; school children were all vaccinated last year.	.....	Seven; 1 room in each.	.....
.....	No.....	.....	Nineteen.....	Don't know.....
No hospital; the dwellings of patients are isolated.	Vaccination was attended to in 1894.	.....	Thirteen schools; 1 school has 2 rooms, the others 1 each; 1,229 school children.	.....
No hospital; patients isolated in homes.	No; don't know....	Usual disinfectants are made use of.	Twenty-one schools; 3 have 2 rooms.	Don't know.....
Houses placarded ..	No; about 240 in 6 sections.	Plenty of boiling water and soap; carbolic acid, etc.	Six; 6.....	.....
Placarding houses ..	Not carried out ..	M. H. O. acts in any case reported.	Seventeen; 17 ..	Sufficient.....
.....	No; 280; none ..	.....	Four; 1; attendance, 101, 103, 48, 36.	.....
Patients confined to the house.	No; 697; only 8 children vaccinated this year.	Paper removed from walls; walls scrubbed; carbolic acid solution used; everything fumigated with sulphur fumes.	Seventeen; 20 ..	.....

## TOWNSHIPS.—Continued.

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Oxford N.....	None.....	Three cheese factories; 3 hands.	Wells; clay and sand.....
Oxford W.....			
Papineau .....	Not supplied .....	None .....	Soil of a sandy nature with a good deal of rock and gravel.
Perry .....			Springs and wells.....
Pelham .....			
Plympton .....		Three cheese factories; 2 hands in each; 1 butter factory, 2 hands.	Artesian and surface wells ..
Puslinch .....	Notification supplied and used by sanitary inspector.	None .....	Springs and wells; soil, sandy loam; sub-soil, gravel.
Pickering .....	Forms supplied physicians; none for teachers.	One apple evaporating factory, 14 hands; 1 pump factory, 3 hands; 1 wood turning factory, 10 hands.	Wells; clay, sand and gravel.
Palmerston.....	No .....	No .....	Wells and springs.....
Pembroke.....			
Proton .....	None supplied.....	Two cheese factories .....	Wells .....
Peele .....	When necessary .....	None .....	Lake water.....
Percy .....	M. H. O. only.....	None .....	Wells; sand and gravel clay sub-soil.

## TOWNSHIPS.—Continued.

No. of dairy cows. Is there medical or veterinary inspection? Give details of any examination of herds for tuberculosis.	Slaughterhouses. Give number licensed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so, is there contract removal.	State number and kind of noxious trades. How licensed and regulated? (See sec. 63, Public Health Act.)
2,000; no .....	Four licensed; offal boiled.	Householder.....	.....	None.
None.....	Two; none licensed; natural drainage; offal fed to hogs.	No special arrangement; by householder generally.	No special arrangement.	None.
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
.....	None.....	.....	.....	.....
None except farmers' milk cows; no examination of herds.	None licensed; all are kept in a sanitary condition.	By householder ....	By householder; dry earth closets are gradually coming into use.	None.
Don't know; no inspection.	Six; 6; natural drainage.	.....	.....	None.
900; no; none.....	None.....	Put on land .....	.....	None.
.....	.....	.....	.....	.....
Not known; no; none.	None.....	No system.....	.....	None.
.....	None.....	.....	.....	.....
Don't know; no inspection.	One; no license ....	Householder.....	.....	.....

TOWNSHIPS.—*Continued.*

Municipality.	Names of M. H. O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Pittsburg .....			Municipality is free from all contagious diseases; no complaints have come before the Board.
Pilkington .....	— Robertson, M.D. ....		Typhoid, 2 cases .....
Rolph, Buchanan and Wylie.	— Gray, M.D. ....	None .....	None .....
Raleigh .....	S. N. Young, M.D. ....	No system of general inspection.	Scarlatina, 4 cases; typhoid, 13 cases.
Radcliffe and Raglin..	Joseph Kinder, sanitary inspector.		Scarlet fever, 4 cases, 1 death.
Rainham .....	John Fry, M.D. ....		Typhoid, 1 case .....
Rama .....	W. C. Gilchrist, M.D.	When any outbreak occurs premises are inspected.	Scarlatina, 5; diphtheria, 15; typhoid, 5.
Rowdon .....	None .....	Members of Board look after the inspection.	Diphtheria, 1, 1 death .....
Rochester .....	D. Richard, M.D.; J. Strong, sanitary inspector.	When inspector is notified.	Scarlatina, 2; typhoid, 2....
Russell .....	D. S. McDougall, M.D. J. Brisson, sanitary inspector.		Diphtheria, 8 cases, 4 deaths; typhoid 2.
Reach .....	None .....	Inspection by members of Board when complaint is made.	Several cases of diphtheria, 1 death reported; several cases typhoid, 1 death; physicians fail to report the number of cases.
Sault Ste. Marie .....	C. Scherk, M.D. ....		Scarlatina, 1 case, 1 death ..
Sarawak .....	C. W. Lang, M.D.; J. C. Atkins, sanitary inspector; Wm. Lee, sanitary inspector.	General inspection by sanitary inspectors.	Scarlet fever, 7 cases, 1 death; diphtheria, 4 cases; typhoid, 3 cases.
Sandfield .....	Wm. McDonald, M.D.		None .....
Scugog .....	— Clemens, M.D. ....		Diphtheria, 4 cases, 2 deaths; typhoid, 3 cases, 1 death.
Stanhope and Sherbourne, etc.		Inspection by members of Board and sanitary inspector.	Scarlatina, 2 cases; diphtheria, 2 cases.

TOWNSHIPS.—*Continued.*

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
None .....	No; none .....	Disinfection by ordinary means.	Five; 5; about 40 ..	.....
.....	No.....	.....	Six; one room in each.	.....
No hospital; kept separate; houses placarded.	Yes; 1,007; none...	Fumigated by burning sulphur and washing with carbolic acid solution.	Twenty; one room; average attendance about 30.	350 cubic feet. ....
.....	.....	.....	.....	.....
.....	.....	.....	Six schools .....	.....
Houses isolated; no isolation hospital.	No; cannot say....	Rooms washed with carbolic acid solution, and fumigated with sulphur, etc.	Five schools; 5 rooms; average 40.	Don't know .....
.....	No.....	Under attending physician.	Fifteen.....	.....
.....	.....	.....	Ten.....	.....
General isolation; placarding houses.	No; 850; about 20 vaccinated.	Houses fumigated; schools closed; sulphur and carbolic solution used.	Fourteen; 16; attendance 50.	Two hundred and fifty.
.....	No; 852 between the ages of 5 and 16, 327 between 16 and 21.	.....	Sixteen .....	.....
None .....	.....	.....	Five.....	Sufficient .....
Isolation in houses..	No; 370; none in 1894.	Dr. Lang attends to the disinfection.	Four .....	.....
.....	No; none .....	.....	Three; three .....	.....
Isolation in their homes.	Not compulsory; 131	Such as is ordered by attending physician.	Three; three .....	.....
None .....	No; 93; don't know	In diphtheria cases under direction of physician in charge.	Nine; nine .....	.....



TOWNSHIPS.—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Pittsburg.....			
Pilkington .....	None.....	None .....	Gravel .....
Rolph, Buchanan and Wylie.	No occasion to use them.	None.....	Sandy loam ....
Raleigh .....	Supplied, but not used.	None; except one evaporating factory, 20 hands; one cheese factory, 8 hands.	Wells; blue clay.....
Radcliffe and Raglin..			
Rainham .....			
Rama .....	None.....	None.....	Wells; principally clay soil.
Rowdon.....	None.....	Ten cheese factories; 2 hands in each.	Wells; gravel and clay .....
Rochester .....		One cheese factory.....	Generally clay soil.....
Russell.....	Yes.....	Woollen factory, 10 hands; cheese factory, 10 hands.	Sandy loam .....
Reach .....	No.....	None.....	Generally sub-soil.....
Sault Ste. Marie.....	No .....	None .....	Sand and clay.....
Sarawak .....	Yes; yes .....	None .....	Wells and springs and lake water, which is considered the best.
Sandfield .....		None .....	
Seugog .....	No .....	None .....	Wells and springs .....
Stanhope and Sherbourne, etc.	None .....	One cheese factory, 3 bands.	Rivers, lakes and wells....

## TOWNSHIPS.—Continued.

No. of dairy cows. Is there medical or veterinary inspec- tion? Give details of any examina- tion of herds for tuberculosis.	Slaughterhouses. Give number li- censed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by con- tract or only by householder.	Sewage. How dis- posed of, whether by dry earth closets. If so, is there contract re- moval?	State number and kind of noxious trades. How licen- sed and regulated? (See sec. 63 Public Health Act).
None.....	None.....	Householder . . . . .		
No.....	No slaughterhouses.			
One dairy farm for supplying Chatham with milk; no in- spection.	Three slaughter- houses; open drains; offal fed to hogs.	By householder....	Privy pits.....	None.
Cannot say; no tub- erculosis.	None.....			
7,383 cattle in town- ship.	Two; no license....	Householder.....		
		Householder.....		
4,000 cows.....	Two; none.....	Householder.....		
Rural district, no inspection.	None . . . . .	Householder . . . . .		None.
Private dairies.....	One; no license . . . .	Householder . . . . .		
	None . . . . .	Householder . . . . .		
No dairies.....	None . . . . .	Householder . . . . .		
Thirty; no; none..	None . . . . .	Householder . . . . .	None . . . . .	None.

## TOWNSHIPS.—Continued.

Municipality.	Names of M. H. O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Saltfleet .....	Leeming Carr, M.D. ....	.....	Three cases diphtheria; 3 scarlet fever; 4 typhoid fever; physicians living outside the tp. fail in making reports of diseases.
Sandwich, East .....	Joseph Reannie, M.D.; H. Vanderlander, sanitary inspector.	Inspection of nuisances when M.H.O. requests.	Scarlatina, 3 cases; diphtheria, none; typhoid, none.
Southwold .....	.....	Inspection of slaughterhouses, pig pens, cheese factories, school premises and dairies was made and found in a sanitary condition.	Typhoid, 3 cases.....
Seneca .....	None .....	Inspection by Local Board..	None .....
Sunnidale... ..	G. Hunt, M.D.; T. Macham, sanitary inspector.	.....	Diphtheria, 1 case; typhoid, 1 case.
Strong .....	D. Carmichael, M.D.; John Pagit, sanitary inspector.	No particular method .....	None .....
Sombra .....	D. K. Stenton, M.D. ....	None .....	Scarlatina, 10 cases; diphtheria, 3 cases.
Sheffield .....	H. W. Wilson, M.D.; L. Loyst, sanitary inspector.	Sanitary inspector visits premises and vacant lots and inspects closets, yards, etc.	Typhoid, 4 cases.....
Sabastapol .....	None .....	None .....	Diphtheria, 10 cases, 2 deaths
Sherbrooke .....	N. Hopkins, M.D.....	.....	.....
Sullivan.....	G. N. Cook, M.D.; Wm. Smith, sanitary inspector.	.....	Scarlatina, 32 cases, 3 deaths.
Saugeen.....	— Veitch, M. D.; Robert Smith, sanitary inspector.	Sanitary inspector reports all premises in a sanitary condition.	Typhoid, 3 cases.....
Scarboro' .....	O. Sisley, M.D.....	General inspection once a year.	Scarlatina, 7 cases, 1 death; diphtheria, 4 cases; typhoid, 8 cases, 1 death.
Sophiasburg.....	J. Crayan, M.D. ....	.....	None .....
Sydenham.....	A. C. Sloane, M.D.; Charles McArthur.	.....	Scarlatina, 41 cases; diphtheria, 15 cases; typhoid, 4 cases.

TOWNSHIPS.—*Continued.*

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
				148 .....
Patients are isolated in their homes.	General vaccination in 1894.	House placarded and thorough disinfection by M.H.O.	Eight; eleven .....	
Placard; isolate family as well as possible.	No .....	Burning infected clothing; fumigation, etc.	Twelve; twelve ....	Don't know .....
	No .....	Isolation and disinfection.	Twelve .....	
No .....	No .....		Six .....	
Placarding; infected persons not allowed to mingle with the public.	General in 1894; none in 1895.	Clothing and furniture cleaned; infected apartments fumigated.	Sixteen .....	Don't know .....
Patients kept in most isolated part of house and disinfecting excreta.	No; don't know ....		Sixteen .....	
None .....	None .....	None .....	Three .....	Don't know .....
None .....	No .....		Two .....	One, 220; one, 300..
Isolated six weeks in home of patients.	No; 949 in tp .....	Fumigation by sulphur, etc.	Fifteen; sixteen....	
As ordered by the attending physician.	Vaccination not compulsory; 610 children in tp.	As done by physicians in attendance; no isolation hospital.	Seven; seven .....	
Patients isolated in homes.	No .....	Carbolic acid solution; sulphurous fumes.	Twelve .....	
None .....	None .....	Not necessary .....	Fourteen .....	
Isolated in homes...	No; none vaccinated.	Ordinary disinfectants used.	Sixteen .....	

TOWNSHIPS.—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Saltfleet.....	No .....	One cheese factory, 2 hands .....	.....
Sandwich, East .....	.....	.....	.....
Southwold .....	.....	.....	.....
Seneca .....	None .....	Two cheese factories, 4 hands; 2 saw mills, 8 hands.	Wells; clay .....
Sunnidale .....	None .....	None .....	Principally wells .....
Strong .....	.....	One cheese factory .....	Light soil .....
Sombra .....	None .....	None .....	Generally clay .....
Sheffield .....	Physicians only .....	None .....	Wells .....
Sabastapol .....	No; no .....	None .....	Springs, wells and creeks ...
Sherbrooke .....	.....	None .....	Wells; clay sub-soil .....
Sullivan .....	.....	.....	Wells; gravel and clay .....
Saugeen .....	Supplied .....	Two cheese factories, 2 hands in each.	Wells, rivers and creeks ....
Scarboro' .....	Not supplied .....	None .....	Heavy clay and loam .....
Sophiasburg .....	None .....	Six cheese factories .....	Clay and rock .....
Sydenham .....	Yes .....	None .....	Wells; clay loam and gravel



## TOWNSHIPS.—Continued.

No. of dairy cows. Is there medical or veterinary inspec- tion? Give details of any examination of herds for tuber- culosis.	Slaughterhouses. Give number li- censed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by con- tract or only by householder.	Sewage. How dis- posed of, whether by dry earth closets. If so, is there contract re- moval?	State number and kind of noxious trades. How licen- sed and regulated? (See sec. 63 Public Health Act).
.....	Three; none licen- sed; by ditches; offal burned and buried.	Householder .....	Privy pits generally.	None.
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
Don't know; no; none.	Two; offal fed to hogs; isolated.	Householder .....	Closets .....	.....
About 1,000; no in- spection.	.....	Different ways.....	.....	.....
.....	.....	Householder .....	Dry earth closets...	None.
Don't know; no in- spection.	Don't know .....	Householder .....	No contract for re- moval.	.....
Don't know .....	None .....	Householder .....	Dry earth closets...	None.
549 cows; no inspec- tion; no examina'n.	None .....	Householder.....	.....	None.
None .....	None ..	Householder.....	Closets .....	None.
.....	One .....	.....	.....	.....
Don't know; no in- spection or exam- ation.	Five slaughterhouses	Householder.....	.....	.....
Don't know; no in- spection.	Eight; offal is fed to pigs.	Householder.....	.....	.....
Don't know .....	None licensed .....	Householder.....	.....	.....
None .....	None .....	.....	.....	.....

## TOWNSHIPS.—Continued.

Municipality.	Names of M. H. O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Somerville .....	R. S. Frost, M.D.....	None .....	Diphtheria, 12 cases .....
Scott .....	.....	Municipality in a good sanitary condition.	.....
Stamford.....	John M. Dee, M.D.; Wm. C. Swane, sanitary inspector.	As provided in Act.....	Diphtheria, 2 cases; typhoid, 2 cases.
Stafford .....	D. Rattray, M.D.....	.....	None .....
Stisted .....	W. C. Fraser, M.D...	Each member of Board inspects his own district.	Diphtheria, 4 cases; 1 death.
Stephen .....	H. Wichett, M.D.....	.....	Scarlatina, 4 cases; diphtheria, 8 cases; typhoid 10 cases.
St. Vincent.....	.....	Municipality is in a most satisfactory condition as regards sanitation.	Scarlatina, 5 cases; diphtheria, 2 cases.
Tilbury Centre .....	A. Lemire, M.D.; N. Mibert, sanitary inspector.	.....	Typhoid, 12 cases; 3 deaths.
Tecumseth .....	—Law, M.D. ....	.....	Diphtheria, 5 cases; 3 deaths.
Thorah .....	A. Grant, M.D.; S. Wallace, sanitary inspector.	Each member of Local Board keeps supervision of his district.	Diphtheria, 2 cases .....
Thorald .....	H. Park, M.D.....	General inspection each spring and when complaints are made.	Diphtheria, very few; typhoid, 1 case.
Thornberry .....	W. B. Fowler, M.D...	Inspection made on information.	Typhoid, 2 cases.....
Townsend .....	A. C. Duncombe, M.D.	None .....	Diphtheria, 1 case; typhoid 4 or 5 cases; 1 death.
Tosorontio .....	J. J. Williams, M.D..	.....	Scarlatina, 10 cases; diphtheria, 1 case; typhoid, 2 cases.
Torbolton .....	D. Kyle, M.D.....	.....	None .....
Usborne .....	A. K. Ferguson, M.D.	Slaughterhouses are inspected yearly, other premises upon order of M. H. O.	Scarlatina, 4 cases; typhoid, 11 cases; 1 death.

## TOWNSHIPS.—Continued.

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
Isolated in their homes.	None in 1895 .....	Patients disinfected before mingling with public.	Nine .....	
In their own rooms .	No .....	Sulphur fumes, etc..	Eight ; eight .....	
	Not this year .....		Four ; 4 ; 445 school children.	
No .....	No ; 139 .....	Sulphur fumes, chloride of lime, etc.	Five ; five .....	
	Quite a number vaccinated.		Thirteen .....	
	Yes .....		Nine ; eleven .....	One hundred and sixty.
None .....	Don't know .....		Twenty-one .....	
No isolation hospital patients isolated in their own homes.	No ; 414 school children.	Disinfected in the ordinary way.	Four ; 4 rooms ; $\frac{37}{35}, \frac{37}{35}, \frac{37}{35}, \frac{37}{35}$ .	$\frac{375}{35}, \frac{375}{35}, \frac{375}{35}, \frac{375}{35}$ , cubic feet.
			Eight .....	
Buildings placarded.	No ; school population 750.	None .....	Thirteen schools ; 13 rooms.	
None .....	No ; don't know ....	Don't know .....	Twenty-two ; don't know.	Don't know .....
Placed in room up stairs.	No ; 337 .....	Stools disinfected ; sheets hung over doors ; carbolic acid solution used, sulphur burned.	Eight .....	From 350 to 450 cubic feet.
No .....			Five .....	
No isolation hospital, inmates not allowed to mingle with the public.	No ; 763 ; about 50.	Houses isolated ; excreta from patients buried ; all linen in room disinfected daily, etc.	Twelve schools ; 14 rooms.	Two hundred .....

TOWNSHIPS.—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Somerville .....	Physicians supplied only.	None .....	Clay and limestone.....
Scott.....			
Stamford.....	M. H. O. only.....	One bone mill, 3 hands; one grist mill, 2 hands; one wine factory, 3 hands.	Clay, quicksand and gravel..
Stafford .....	No.....	None .....	Wells; clay soil and gravelly bottom.
Stisted .....	None .....	None .....	Wells; sandy loam.....
Stephen .....	Yes .....	None .....	Wells; clay and sand.....
St. Vincent .....			
Tilbury Centre .....	No.....	None .....	Clay loam.....
Tecumseth .....	None .....	None .....	Clay loam .....
Thorah .....	None .....	Two brick yards, 1 pottery; employing 12 and 7 hands respectively.	Wells; clay loam, sub-soil, gravel and clay.
Thorald .....	None .....	None .....	Wells; clay ... ..
Thornberry .....	Yes, when necessary ..		All wells.....
Townsend .....		Three cheese factories.....	Wells; sandy loam.....
Toscorontio .....	None .....	None .....	Wells; sandy soil, sub-soil gravel.
Torbolton .....		One cheese factory; 1 hand.	
Usborne.....	Yes; yes.....	One cheese factory; 1 hand.	Clay, gravel bottom .....

## TOWNSHIPS.—Continued.

of dairy cows, there medical or veterinary inspection? Give details of any examination of herds for tuberculosis.	Slaughterhouses. Give number licensed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so, is there contract removal?	State number and kind of noxious trades. How licensed and regulated? (See sec. 63 Public Health Act).
.....	None .....	Householder .....	.....	.....
.....	.....	.....	.....	.....
by cows; no inspection; no examination.	Four; natural drainage.	By householder.....	.....	1 bone mill licensed during pleasure of council.
know .....	None .....	Householder .....	.....	.....
.....	None .....	Householder .....	.....	.....
know; no inspection.	Three; none licensed.	Householder.....	.....	.....
.....	.....	.....	.....	.....
inspection .....	None .....	.....	Dry earth closets .....	None.
.....	Two licensed .....	Householder .....	.....	.....
; no inspection.	One; no drainage; offal boiled.	Householder.....	Sewage generally buried.	None.
.....	Two; surface drainage.	Rural district.....	Privy vaults.....	None.
know; no examination.	.....	.....	.....	.....
.....	.....	.....	.....	.....
know; no inspection.	Two; no license .....	Householder.....	.....	.....
.....	.....	.....	.....	.....
tion is made all suspicious.	.....	Householder.....	No system .....	.....



TOWNSHIPS.—*Continued.*

Municipality.	Names of M. H. O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Uxbridge .....			Diphtheria, 1 case; typhoid, 1 case.
Vaughan .....	T. H. Robinson, M.D.; R. Rumale, sanitary inspector.		
Vesper .....	W. Wallivin, M.D....	Inspection made when necessary.	
Walsingham, S. ....	H. Terry, sanitary in- spector.	None .....	Diphtheria, 1 case .....
Walsingham, N. ....	B. Robinson, sanitary inspector.	None .....	None .....
Woolwich .....	W. Robinson, M.D....	Inspection made when com- plaints come in.	Scarlatina, 9 cases; 1 death; typhoid, 30 cases; 2 deaths.
Wallace .....	J. W. Thompson, M.D.; John Willoughby, sanitary inspector.	Personal inspection by mem- bers of Board.	Scarlatina, 2 cases; typhoid, 11 cases, 2 deaths.
Wainfleet .....	W. B. Hopkins, M.D....	Cursory by M. H. O. ....	Scarlatina, about 40 cases; diphtheria, a few isolated cases; typhoid, 29 cases.
Waterloo .....	A. H. Rahacks, M.D.; Owen Reist, sanitary inspector.	General inspection under di- rection of M.H.O.	Typhoid, 40 cases.
Wellesley .....	Wm. Morton, M.D....	Inspection made when asked for. Township has no more than the average share of perplexities.	Typhoid, 12 cases, 1 death...
Wawanosh, E. ....	John McAble, M.D....	No regular system .....	Scarlatina, a goodly number of cases; typhoid, 4 cases.
Wawanosh, W. ....	T. E. Case, M.D. ....		Scarlatina, a number of cases of scarlatina and typhoid.
Williamsburg .....		No complaints of any con- tagious diseases in town- ship until the 18th Decem- ber; 3 cases reported then.	
Wilberforce and N. Algona.	John Channonhouse, M.D.		Scarlatina, 6 cases; diph- theria, 3 cases, three deaths.
Whitchurch .....	H. Coulter, M.D., W. True, M.D.; G. H. Powell, sanitary in- spector.	Nothing done except com- plaint is made.	Scarlatina 2 cases; diph- theria, 5 cases, 1 death.

TOWNSHIPS — *Continued.*

Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
Isolated by attending physician.	No.	Disinfected by attending physician.	Twelve; twelve Nineteen	
No hospital; patients isolated in their dwelling.	No, yes; don't know.		Ten	
No particular method.	No.		Ten	
None.	No.	None	Nine	
	General vaccination in 1894.		Twelve	
No	No; general vaccination in 1894.	Yes	Fifteen	Sufficient.
None.		Houses fumigated.	Twelve	
By placarding buildings.	General vaccination in 1894.	Carbolic and sulphur fumes.	Twenty-seven; average attendance about 35 in each.	
No methods	No.	Very little done.		
	No; the M.H.O. visited schools in 1894 and vaccinated those who wished to have it done.		Eight; 9.	
Patients isolated in their homes.	No; about 490; none.		Eight; 8.	
Houses placarded.	No	Physicians in attendance give orders.	Fifteen; 15	

TOWNSHIPS.—*Continued.*

Municipality.	Forms for notification by teachers and M. H. O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and the number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Uxbridge.....	Yes.....	None .....	Sandy loam, quicksand .....
Vaughan.....			
Vesper.....	No.....	None .....	Wells; soil varies .....
Walsingham, S. ....	No.....	Two cheese factories.....	Wells .....
Walsingham, N.....	No; no .....	Three cheese factories .....	Wells .....
Woolwich .....			Wells and springs; soil light loam.
Wallace.....	No.....	Three cheese factories; 2 hands in each.	Wells .....
Wainfleet .....	None .....	None .....	Wells and river.....
Waterloo.....	None supplied.....		Usually gravel sub-soil .....
Wellesley .....			
Wawanosh, E .....	Not supplied .....		Good.....
Wawanosh, W.....			
Williamsburg .....			
Wilberforce and N. Algona.			
Whitchurch .....	None .....	None.....	Wells .....

## TOWNSHIPS.—Continued.

No. of dairy cows. Is there medical or veterinary inspection? Give details of any examination of herds for tuberculosis.	Slaughterhouses. Give number licensed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by contract or only by householder.	Sewage. How disposed of, whether by dry earth closets. If so, is there contract removal.	State number and kind of noxious trades. How licensed and regulated? (See sec. 63 Public Health Act.)
None .....	None .....	.....	.....	None.
.....	Three .....	.....	.....	.....
No record .....	None .....	Householder.....	.....	None.
Don't know; no; no.	None .....	.....	.....	.....
Don't know; no; no.	None .....	.....	.....	.....
None; veterinary inspection made in 2 cases, animals slaughtered.	Two .....	Householder.....	.....	.....
.....	One.....	Householder.....	.....	.....
No dairies.....	.....	Householder.....	Buried .....	None.
333 cows; veterinary inspection; no examination.	Thirteen slaughter- houses; natural drainage; offal fed to hogs.	Carted on to land by householder.	.....	Glue factory; un- licensed.
.....	.....	.....	.....	None.
No inspection .....	None .....	As most convenient.	.....	None.
.....	.....	.....	.....	None.
.....	.....	.....	.....	None.
.....	.....	.....	.....	None.
No inspection.....	Four meat associa- tions have four slaughterhouses.	.....	Pits and dry earth..	None.

TOWNSHIPS—*Concluded.*

Municipality.	Names of M.H.O. and sanitary inspector.	State extent and methods of general inspection.	Contagious diseases.
Westminster.....	A. G. Routledge, M. D.; T. Tomlinson, sanitary inspector.	.....	A large number of cases of typhoid.
Woolwich .....	W. O. Robinson, M.D.	Inspection made when required.	Scarlatina, 1 death; typhoid, 32, 2 deaths.
Wilmot .....	W. R. Nichols, M.D.; J. Wahl, sanitary inspector.....	Annual inspection made and special on complaint.	Diphtheria, 6 cases; typhoid, 12 cases.
Watt .....	.....	Each member of the Board looks after his district.	None.....
Wollaston .....	Wm. Dafoe, M.D.; A. Watt, sanitary inspector.	General inspection by sanitary inspector.	Diphtheria, an outbreak in February and March.
Yarmouth.....	R. L. Sanderson, M.D.; W. O. Pollick, sanitary inspector.	By sanitary inspector.....	Small pox, 1 case.....
Yonge and Escott "Front".	I. W. Lane, M.D.; W. I. Malloy, sanitary inspector.	No general inspection made; inspection made when required.	None .....
York .....	T. I. Page, M.D.; J. V. Michell.	Inspection by sanitary inspector.	Diphtheria, 15 cases; typhoid, several cases.



TOWNSHIPS—*Concluded.*

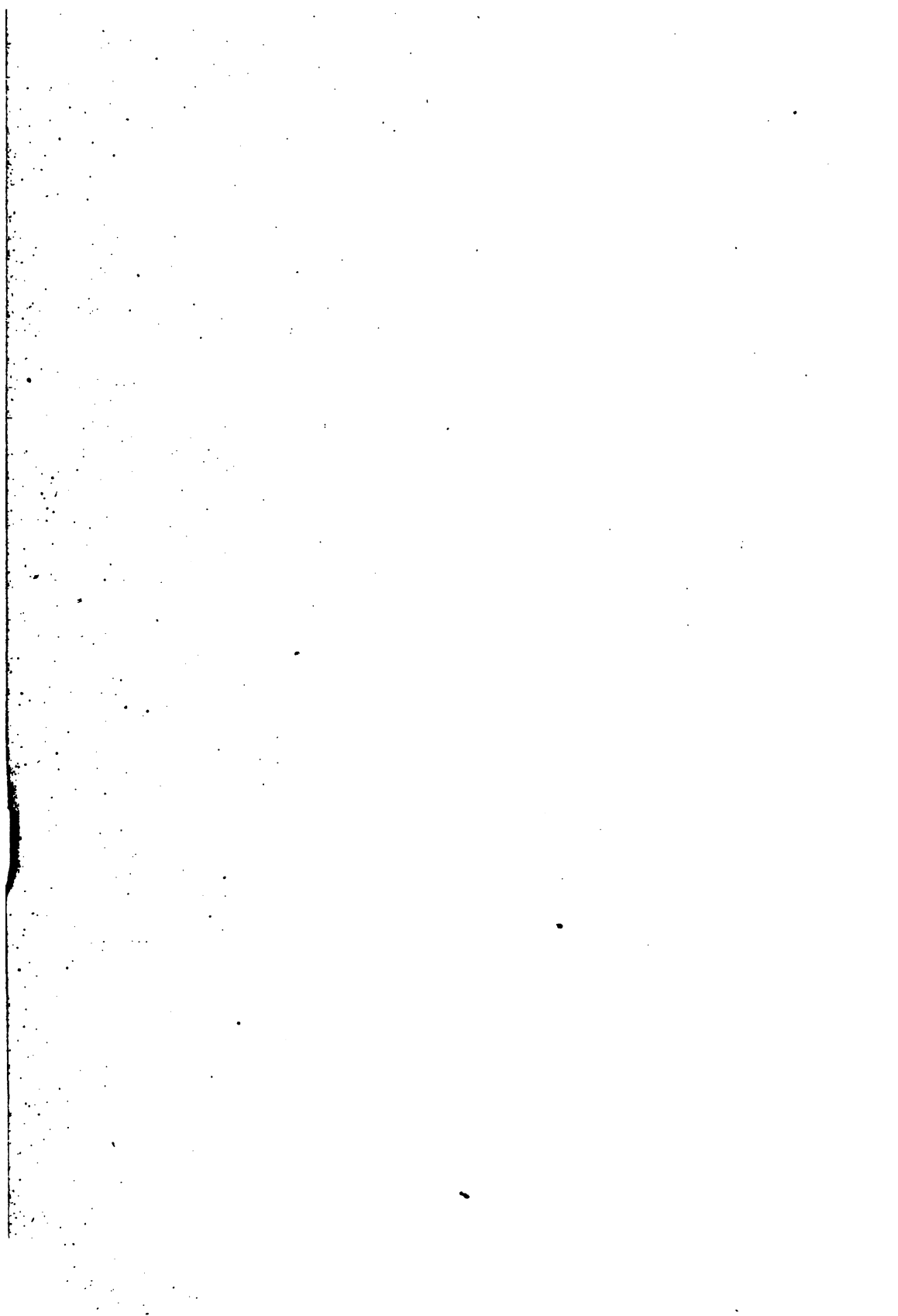
Isolation of contagious diseases. State methods and whether any isolation hospital.	Has vaccination been compulsory? State school children in municipality. How many vaccinated in 1895.	Disinfection of contagious diseases. Give details and how carried out.	Number of schools, number of rooms, and attendance in each.	Average cubic air space to each pupil.
London Hospital used if necessary.	Well attended to. ....		Twenty-two; 24....	
No; voluntary vaccination; no hospital.		Disinfection is practised; washing room, bed clothing and patient with bi-chloride solution.	Twenty-one.....	
None .....	No. ....		Seven .....	
	No. ....	Usual disinfectants used.	Eight .....	
	No; children have been vaccinated at school by order of the Board.		Twenty-one .....	
None .....	None .....	None .....	Eighteen; 19 .....	Don't know .....
Such as can be employed in private houses.	No; cannot say.....	Attending physician does this under the supervision of M. H.O.	Twenty-four.....	

TOWNSHIPS—*Concluded.*

Municipality.	Forms for notification by teachers and M. H.O. of contagious diseases. Are both supplied? Do both make use of them?	Number of factories and institutions. State their character and number of employees in each.	Water supply. Where wells are used give character of soil and sub-soil.
Westminster.....		Six cheese factories .....	All wells; all kinds of soil ..
Woolwich .....			
Wilmot .....	Not supplied .....	Flax mill, 7 hands; foundry, 7 hands; linseed oil mill, 30 hands; Tannery, 2 hands; cigar box factory, 8 hands; two grist mills, 5 hands; six chopping mills, 12 hands; nine blacksmith shops, 1 to 2 each; three cheese factories, 2 each; one creamery, 2; six tailor shops, 2 to 3; six shoe shops, 1 to 2; five butcher shops, 1 to 2; two cooper shops, 1 to 2; three cider mills, 1 to 2.	Wells; clay and sand loam..
Watt .....	Supply themselves....	One cheese factory.....	Heavy clay to sand .....
Wollaston .....	Don't know.....	Two cheese factories .....	Generally from springs.....
Yarmouth.....			
Yonge and Escott "Front."	Don't know.....		Wells; gravel and clay .....
York .....		One bolt works, one woollen mill, one stove factory, one fat rendering factory, one paper mill, two potteries, three grist mills, four brick yards.	Wells and springs; mostly clay soil.

TOWNSHIPS—*Concluded.*

No. of dairy cows. Is there medical or veterinary inspec- tion? Give details of any examina- tion of herds for tuberculosis.	Slaughterhouses. Give number li- censed. How drained and how offal is disposed of.	Disposal of garbage and night soil, whether by con- tract or only by householder.	Sewage. How dis- posed of, whether by dry earth closets. If so, is there contract re- moval?	State number and kind of noxious trades. How licen- sed and regulated? (See sec. 63 Public Health Act.)
No examination or inspection.	Four licensed .....	By householder ....	Pits and dry earth closets.	None.
.....	.....	.....	.....	None.
Number unknown; no inspection in 1894; tuberculosis found in cattle 1895; 2 cattle de- stroyed.	Five; no license; buried.	Buried by house- holder.	Dry earth closets; no contract.	None.
400; none .....	None .....	Householder.....	.....	.....
Don't know .....	None .....	.....	.....	None.
No inspection .....	Seven adjoining city of St. Thomas under inspection.	.....	.....	None.
No; none .....	None .....	Householder.....	.....	.....
A great many; no tuberculosis.	Some 20; offal fed to hogs.	Householder.....	Householders; no contract removal.	.....











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